IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Peter Zatloukal, et al.	
U.S. Patent No.:	9,405,947	Attorney Docket No.: 50095-0182IP1
Issue Date:	August 2, 2016	
Appl. Serial No.:	13/750,970	
Filing Date:	January 25, 2013	
Title:	EMULATED RADIO FREQUENCY IDENTIFICATION	

DECLARATION OF DR. ZHI DING

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code.

Dated: 28 August 2024

By: 
Digitally signed by Zhi Ding
Date: 2024.08.28 10:35:22 -07'00'

Zhi Ding

APPLE 1003

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RELEVANT CLAIMS

Claim 1	
[1.pre]	A method for operating a mobile communication device comprising:
[1.1]	receiving, by the mobile communication device, a radio frequency identification (RFID) probing signal from an RFID reader external to the mobile communication device;
[1.2]	executing, on processing circuitry in the mobile communication device, instructions stored in a memory in the mobile communication device,
[1.3]	the instructions configured to cause the mobile communication device to: output an RFID signal and output a voice call signal,
[1.4]	wherein the RFID signal is output in response to the mobile communication device determining the mobile communication device is in an operational space of the RFID reader based upon receipt of the RFID probing signal, and
[1.5]	wherein the voice call signal is output over a wireless network and within a radio frequency range that is different than a radio frequency range used to output the RFID signal.

Claim 2	
[2]	The method of claim 1, wherein the RFID signal includes RFID data comprising a selected one of a security key and an identifier.
Claim 3	
[3]	The method of claim 2, wherein the security key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.
Claim 4	
[4]	The method of claim 2, wherein the identifier comprises a selected one of a social security number, a driver's license number, an affinity program account number, and a credit card number.
Claim 5	
[5]	The method of claim 2, wherein the method further comprises facilitating a user in selecting the RFID data from a plurality of the RFID data using the mobile communication device.
Claim 6	

[6]	The method of claim 2, wherein the method further comprises facilitating provision of the RFID data to the mobile communication device.
Claim 7	
[7]	The method of claim 6, wherein facilitating provisioning of the RFID data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID data.
Claim 8	
[8]	The method of claim 1, wherein the mobile communication device is one of a wireless mobile phone and a personal digital assistant equipped with communication capability.
Claim 9	
[9.pre]	A method for operating a mobile communication device comprising:
[9.1]	executing, on processing circuitry in the mobile communication device, instructions stored in a memory in the mobile communication device,

[9.2]	the instructions configured to cause the mobile communication device to monitor, output an RFID signal, and output a voice call signal;
[9.3]	wherein the monitoring comprises monitoring for a proximal presence of a radio frequency identification (RFID) reader external to the mobile communication device and determining the mobile communication device is in an operational space of the RFID reader based on an RFID probing signal received by the mobile communication device from the RFID reader;
[9.4]	wherein the outputting of the RFID signal comprises outputting the RFID signal in response to determining the mobile communication device is within the proximal presence of the RFID reader based u on receipt of the RFID robin signal; and
[9.5]	wherein the outputting of the voice call signal comprises outputting the voice call signal over a wireless network in a radio frequency range different than a radio frequency range in which the RFID signal is output.
Claim 10	

[10]	The method of claim 9, wherein the RFID signal includes RFID data comprising a security key.
Claim 11	
[11]	The method of claim 10, wherein the security key comprises a door key.
Claim 12	
[12]	The method of claim 11, wherein the door key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.
Claim 13	
[13]	The method of claim 10, wherein the instructions are further configured to cause the mobile communication device to facilitate provision of the RFID data to the mobile communication device.
Claim 14	
[14]	The method of claim 13, wherein facilitating provisioning of the RFID data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID data.
Claim 15	

[15]	The method of claim 9, wherein the mobile communication device is one of a wireless mobile phone and a personal digital assistant equipped with communication capability.
Claim 16	
[16.pre]	A mobile communication device comprising:
[16.1]	communication circuitry configured to output voice call signals in a first radio frequency range over a wireless network and output radio frequency identification (RFID) signals in a second radio frequency range, which is different than the first radio frequency range;
[16.2]	processing circuitry; and
[16.3]	a storage medium including instructions, which, when executed by the processing circuitry cause the mobile communication device to:
[16.4]	monitor for a proximal presence of an RFID reader external to the mobile communication device via the communication circuitry,
[16.5]	the monitoring comprising determining the mobile communication device is in an operational space of the RFID

	reader based on an RFID probing signal received by the mobile device from the RFID reader;
[16.6]	output a voice call signal for transmission over a wireless network via the communication circuitry in the first radio frequency range; and
[16.7]	output an RFID signal via the communication circuitry in response to detection of the proximal presence of the RFID reader external to the mobile communication device based upon receipt of the RFID probing signal, wherein the RFID signal is output in the second radio frequency range.
Claim 17	
[17]	The mobile communication device of claim 16, wherein the RFID signal includes RFID data comprising a selected one of a security key and an identifier.
Claim 18	
[18]	The mobile communication device of claim 17, wherein the security key comprises a door key.
Claim 19	

[19]	The mobile communication device of claim 18, wherein the door key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.
Claim 20	
[20]	The mobile communication device of claim 17, wherein the identifier comprises a selected one of a social security number, a driver's license number, an affinity program account number, and a credit card number.
Claim 21	
[21]	The mobile communication device of claim 17, wherein the instructions are further configured to cause the mobile communication device to facilitate a user in selecting the RFID data from a plurality of RFID data.
Claim 22	
[22]	The mobile communication device of claim 17, wherein the instructions are further configured to cause the mobile communication device to facilitate provision of the RFID data to the mobile communication device.
Claim 23	

[23]	The mobile communication device of claim 22, wherein the instructions are further configured to cause the mobile communication device to include provisioning of at least a signaling attribute associated with the RFID data in the form of a radio frequency signal.
Claim 24	
[24]	The mobile communication device of claim 17, wherein the RFID data includes information identifying a user.
Claim 25	
[25]	The mobile communication device of claim 16, wherein the mobile communication device is one of a wireless mobile phone and a personal digital assistant equipped with communication capability.
Claim 26	
[26.pre]	A mobile communication device comprising:
[26.1]	communication circuitry configured to transmit voice call signals in a first radio frequency range over a wireless network;
[26.2]	processing circuitry; and

[26.3]	a memory storing instructions, which, when executed by the processing circuitry cause the mobile communication device to:
[26.4]	monitor for a proximal presence of a radio frequency identification (RFID) reader external to the mobile communication device via the communication circuitry,
[26.5]	the monitoring comprising determining the mobile communication device is in an operational space of the RFID reader based on an RFID probing signal received by the mobile communication device from the RFID reader;
[26.6]	in response to determining the mobile communication device is in the operational space of the RFID reader based upon the receipt of the RFID probing signal, output an RFID signal via the communication circuity in a second radio frequency range that is different than the first radio frequency range; and
[26.7]	transmit a voice call signal to another mobile communication device via the communication circuitry at least in part over a wireless network in the first radio frequency range.
Claim 27	

[27]	The mobile communication device of claim 26, wherein the RFID signal includes RFID data comprising a security key.
Claim 28	
[28]	The mobile communication device of claim 27, wherein the security key comprises a door key.
Claim 29	
[29]	The mobile communication device of claim 28, wherein the door key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.
Claim 30	
[30]	The mobile communication device of claim 26, wherein the instructions are further configured to cause the mobile communication device to facilitate provision of RFID data to the mobile communication device.
Claim 31	
[31]	The mobile communication device of claim 30, wherein the instructions are further configured to cause the mobile communication device to include provisioning of at least a

	signaling attribute associated with the outputting of the RFID data in the form of a radio frequency signal.
Claim 32	
[32]	The mobile communication device of claim 26, wherein the mobile communication device is one of a wireless mobile phone and a personal digital assistant equipped with communication capability.

EXHIBITS

APPLE-1001	U.S. Patent No. 9,405,947 to Zatloukal, et al. ("the '947 Patent")
APPLE-1002	Excerpts from the Prosecution History of the '947 Patent ("the Prosecution History")
APPLE-1004	U.S. Patent Publication No. 2005/0083177 ("Willgert")
APPLE-1005	U.S. Patent Publication No. 2003/0045235 ("Mooney")
APPLE-1006	International Pub. No. WO 02/49322 ("Holloway")
APPLE-1007	U.S. Patent No. 7,308,426 ("Pitroda")
APPLE-1008	Excerpts from the Prosecution History of U.S. Pat. No. 8,127,984 ("the '984 Patent Prosecution History")
APPLE-1009	Excerpts from the Prosecution History of U.S. Patent No. 8,381,974 ("the '974 Patent Prosecution History")
APPLE-1010	U.S. Patent No. 5,943,624 ("Fox")
APPLE-1011	U.S. Patent Publication No. 2003/0187787 ("Freund")
APPLE-1012	International Pub. No. WO 98/43366 ("Schlang")
APPLE-1013	Hallberg & Nilsson, "Positioning with Bluetooth, irDA and RFID," Master's Thesis, 2002:125 (Jan. 2002) ("Hallberg")
APPLE-1014	Takikawa, Kumiko, et al. "RF circuits technique of dual-band transceiver IC for GSM and DCS1800 applications." Proceedings of the 25th European Solid-State Circuits Conference. IEEE, 1999 ("Takikawa")

APPLE-1015	Razavi, Behzad, "A 900-MHz/1.8-GHz CMOS Transmitter for Dual Band Applications," IEEE Journal of Solid-State Circuits, Vol. 34, No. 5, May 1999 ("Razavi")
APPLE-1016	"Cell Phone Use on the Roads in 2002," Technical Report DOT HS 809 580, National Highway Traffic Safety Administration (Dec. 2004)
APPLE-1017	Scheiderman, "Bluetooth's slow dawn," 2000 IEEE 61-65 ("Scheiderman")
APPLE-1018	Tapley, Byron D., "Eshbach's Handbook of Engineering Fundamentals," Wiley-Interscience (Edition 4), 1990, IBSN 10: 0471890847 ("Tapley")
APPLE-1019	Smart Card Alliance, "Contactless Technology for Secure Physical Access: Technology and Standards Choices" (October 2002)
APPLE-1020	U.S. Patent No. 5,748,737 ("Daggar")
APPLE-1021	Arfwedson & Sneddon, "Ericsson's Bluetooth modules," Ericsson Review No. 4, 1999 ("Arfwedson")
APPLE-1050	Complaint, *Varia Holdings LLC v. Apple Inc.*, 23-cv-7477, E.D.N.Y (filed October 5, 2023)
APPLE-1051	Plaintiff Varia's Preliminary Infringement Contentions, *Varia Holdings LLC v. Apple Inc.*, 23-cv-7477, E.D.N.Y (February 26, 2024)
APPLE-1052	Appendix C: Claim Chart for U.S. Patent No. 9,405,947, *Varia Holdings LLC v. Apple Inc.*, 23-cv-7477, E.D.N.Y (February 26, 2024)

I, Zhi Ding declare that:

I. ASSIGNMENT

1. I have been retained on behalf of Apple to offer technical opinions related to U.S. Patent No 9,405,947 ("the '947 patent") (APPLE-1001). I understand that Apple is requesting that the Patent Trial and Appeal Board ("PTAB" or "Board") to institute an *inter partes* review ("IPR") proceeding of the '947 patent.

2. I have been asked to provide my independent analysis of the '947 patent based on the prior art publications cited in this declaration.

3. I am not and never have been, an employee of Apple. I received no compensation for this declaration beyond my normal hourly compensation based on my time actually spent analyzing the '947 patent, the prior art publications cited below, and issues related thereto, and I will not receive any added compensation based on the outcome of any IPR or other proceeding involving the '947 patent.

II. QUALIFICATIONS

4. I am over the age of 18 and am competent to write this declaration. I have personal knowledge, or have developed knowledge of these technologies based upon education, training, or experience, of the matters set forth herein.

5. I presently hold the title of Distinguished Professor in the Department of Electrical and Computer Engineering at the University of California, Davis.

Since my appointment on July 1, 2000, I have held the position of professor for the past 22 years at the present university and have served as a faculty member at several US universities for over 30 years. I am also a private technical consultant on various technologies related to information systems. I have more than three decades of research experience on a wide range of topics related data communications and signal processing.

6. I earned my Bachelor of Science degree in 1982 in wireless engineering from the Nanjing Institute of Technology (later renamed as Southeast University) in Nanjing, China. I earned my Master of Science degree in 1987 in electrical engineering from the University of Toronto in Toronto, Canada. I earned my Ph.D. in 1990 in electrical engineering from Cornell University in Ithaca, New York.

7. My responsibilities as a Professor at University of California, Davis, include classroom instruction on various topics of communication systems and signal analysis, as well as mentoring undergraduate students and supervising graduate students in their research and development efforts on various topics related to digital communications. I have directly supervised such research and development works ranging from signal detection to wireless networking. As the chief academic advisor, I have also directly supervised the completion of over 20 Masters theses and 30 Ph.D. dissertations on various topics related to digital

communications. I have served full time as a faculty member at three major research universities in the United States over the past 30 years, including Auburn University from 1990 to 1998, University of Iowa from 1999 to 2000, and University of California, Davis, from 2000 to present.

8. Since 1990, I have been selected as the principal investigator of multiple highly competitive federal and local research grants, including more than twenty major research projects supported by the National Science Foundation and two research projects funded by the U.S. Army Research Office. These competitive research projects focused on developing more efficient and effective digital communication transceivers, networks, and signal processing tools. I have also participated in several large-scale projects supported by the Defense Advanced Research Projects Agency (DARPA) with teams of researchers. I have applied for, and received support from, other federal, state, and industry sponsors.

9. I have published over 250 peer-reviewed research articles in premier international journals, in addition to over 250 refereed technical articles at top international conferences on communications and information technologies. According to Google Scholar, my published works have been cited by over 20,000 times by peers. I also authored two books on communications technologies. My most recent book, coauthored with B.P. Lathi, is entitled, “Modern Digital and Analog Communication Systems,” 5th edition, and was published by the Oxford

University Press in 2018. The 4th edition of this book (published in 2009) had been widely adopted as an introductory textbook to communication systems.

10. In addition to the over 500 published technical papers that have been cited over 20,000 times according to Google Scholar[1], I am also co-inventor of 7 issued U.S. patents on communication technologies.

11. I am a member of the Institute of Electrical and Electronics Engineers (IEEE) and was elevated to the grade of Fellow in January 2003 for contributions made in signal processing for communication. The IEEE is the world's largest professional society of engineers, with over 400,000 members in more than 160 countries. The IEEE has led the development of many standards for modern digital communications and networking, most notably, the IEEE 802 series of network standards. The IEEE Grade of Fellow is conferred by the Boards of Directors upon a person with an extraordinary record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year does not exceed one-tenth of one percent of the total voting Institute membership.

12. I have served the IEEE in the following capacities:

- Chief Information Officer of the IEEE Communications Society from Jan. 2018 to present.

[1] https://scholar.google.com, as of August 22, 2024.

- Chief Marketing Officer of the IEEE Communications Society from Jan. 2020 to present.
- General Chair of the 2016 IEEE International Conference on Acoustics, Speech, and Signal Processing, the flagship conference of the IEEE Signal Processing Society.
- Chair of the Steering Committee for the IEEE Transactions on Wireless Communications from 2008 to 2010.
- Distinguished Lecturer of the IEEE Communications Society from January 2008 to December 2009.
- Technical Program Chair of the 2006 IEEE Globecom, one of two flagship annual IEEE Communication Society conferences.
- Distinguished Lecturer of the IEEE Circuits and Systems Society from 2004 to 2005.
- Associate Editor of the IEEE Transactions on Signal Processing from 1994 to 1997 and from 2001 to 2004.
- Member of the IEEE Statistical Signal and Array Processing for Communications Technical Committee from 1993 to 1998.
- Member of the IEEE Signal Processing for Communications Technical Committee from 1998 to 2004.

13. In 2012, I received the Wireless Communications Technical Committee Recognition Award from the IEEE Communications Society, an award given to a person with a high degree of visibility and contribution in the field of "Wireless and Mobile Communications Theory, Systems, and Networks." I received the 2020 Education Award from the IEEE Communications Society. According to the Society, this award "recognizes distinguished and significant contributions to education within the Society's technical scope."

14. I have also served as a technical consultant for the telecommunication industry. For example, in 1995 I consulted for Analog Devices, Inc., on the development of the first generation DOCSIS cable modem systems. I have also consulted for other companies, including Nortel Networks and NEC US Laboratories. I worked as a visiting faculty research fellow at NASA Glenn Research Center in 1992 and at U.S. Air Force Wright Laboratory in 1993. I have served on multiple review panels of the National Science Foundation to evaluate competitive research proposals in the field of communication. I have also reviewed a large number of research proposals at the request of the National Science and Engineering Research Council (NSERC) of Canada as an expert panelist from 2010 to 2013, and also at the request of the Research Grant Council (RGC) of Hong Kong as an external reviewer.

15. I have served as an expert witness or consulting expert on a number of matters related to intellectual property, mostly in the arena of telecommunications, including cellular communications, Wi-Fi technologies, Bluetooth, and optical communications. For example, since 2007, I have been engaged to work on various litigations involving cellular, WiFi, Bluetooth, and optical communication networks.

16. Based on my above-described near three decades of experience in communications technologies, and the acceptance of my publications and professional recognition by societies in my field, I believe that I am qualified to be an expert in wireless communication systems, communication networks, and signal processing.

17. My curriculum vitae, attached as Exhibit A, includes a list of publications on which I am a named author. It contains further details regarding my experience, education, publications, and other qualifications provide to an expert opinion in connection with this proceeding.

III. SUMMARY OF CONCLUSIONS FORMED

18. This Declaration explains the conclusions that I have formed based on my analysis. To summarize those conclusions:

- **Ground 1A:** Based upon my knowledge and experience and my review of the prior art publications in this declaration, I believe

that claims 1, 2, 6-9, 13-17, 22, 23, 25, 26, and 30-32 of the '947 patent are made obvious by Willgert and Mooney

- **Ground 1B:** I believe that claims 1, 2, and 6-8 of the '947 patent are made obvious by Willgert.
- **Ground 2:** Based upon my knowledge and experience and my review of the prior art publications in this declaration, I believe that claims 2-7, 10-14, 17-24, and 27-31 of the '947 patent are made obvious by Willgert, Mooney, Holloway, and Pitroda

IV. LEVEL OF ORDINARY SKILL IN THE ART

19. I have been informed that a person of ordinary skill in the art ("POSITA") is a hypothetical person who is presumed to have the skill and experience of an ordinary worker in the field at the time of the alleged invention. The '947 patent was filed January 25, 2013, and claims priority, via several applications, to Application No. 60/478,245 filed June 13, 2003 ("Critical Date"). Because I do not know at what date the invention as claimed was made, if ever, I have used the Critical Date of the '947 patent as the point in time for claim interpretation purposes. My opinion does not change if the invention date is earlier.

20. Based on my knowledge and experience in the field and my review of the '947 patent and file history, I believe that a person of ordinary skill in the art in this matter would have been someone knowledgeable in mobile communication

devices and components used therein, cellular radio systems, and wireless communications, such as those used for voice calling and radio frequency identification (RFID). That person would have at least a Bachelor's degree in Electrical Engineering, with a background in radio frequency communications as well as approximately two years of experience working with or researching radio frequency communication systems. Based on my experiences, I have a good understanding of the capabilities of a POSITA. Indeed, I have taught, mentored, advised, and collaborated closely with many such individuals over the course of my career.

V. LEGAL PRINCIPLES

21. I am not a lawyer and I will not provide any legal opinions in this IPR. Although not a lawyer, I have been advised that certain legal standards are to be applied by technical experts in forming opinions regarding the meaning and validity of patent claims.

A. Claim Interpretation

22. I understand that claim terms are generally given their plain and ordinary meaning based on the patent's specification and file history as understood by a person of ordinary skill in the art at the time of the purported invention. In that regard, I understand that the best indicator of claim meaning is its usage in the context of the patent specification as understood by a POSITA. I further

understand that the words of the claims should be given their plain meaning unless that meaning is inconsistent with the patent specification or the patent's history of examination before the Patent Office. I also understand that the words of the claims should be interpreted as they would have been interpreted by a POSITA at the time of the invention was made (not today).

B. Priority

23. I understand that a continuation application is a later-filed application that has the same disclosure (specification and figures) as an earlier filed application to which the later-filed application claims priority. A continuation is generally entitled to the same priority date as the later-filed application to which it claims priority.

C. Anticipation

24. I understand that a patent claim is invalid as anticipated if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. I also understand that, to anticipate, the reference must teach all of the limitations arranged or combined in the same way as described in the claim.

25. With respect to inherency, I understand that the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to

establish the inherency of that result or characteristic. Instead, the inherent characteristic must necessarily flow from the teaching of the prior art.

D. Obviousness

26. I understand that a patent claim is invalid if the claimed invention would have been obvious to a person of ordinary skill in the field at the time of the purported invention, which is often considered the time the application was filed. Even if all of the claim limitations are not found in a single prior art reference that anticipates the claim, the claim can still be invalid.

27. To obtain a patent, a claimed invention must have, as of the priority date, been nonobvious in view of the prior art in the field. I understand that an invention is obvious when the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.

28. I understand that, to prove that prior art or a combination of prior art makes a patent obvious it is necessary to: (1) identify the particular references that, singly or in combination, make the patent obvious; (2) specifically identify which elements of the patent claim appear in each of the asserted references; and (3) explain a motivation, teaching, need, market pressure or other legitimate reason

that would have inspired a person of ordinary skill in the art to combine prior art references to solve a problem.

29. I also understand that certain objective indicia can be important evidence regarding whether a patent is obvious or nonobvious. Such indicia include:

- Commercial success of products covered by the patent claims;
- A long-felt need for the invention;
- Failed attempts by others to make the invention;
- Copying of the invention by others in the field;
- Unexpected results achieved by the invention as compared to the closest prior art;
- Praise of the invention by the infringer or others in the field;
- The taking of licenses under the patent by others;
- Expressions of surprise by experts and those skilled in the art at the making of the invention; and
- The patentee proceeded contrary to the accepted wisdom of the prior art.

30. To the extent these factors have been brought to my attention, if at all, I have taken them into consideration in providing my opinions and conclusions.

VI. MATERIALS CONSIDERED

31. My analysis and conclusions set forth in this declaration are based on my educational background and experiences in the field (*see* Section II). Based on my knowledge and experience, I believe that I am considered to be an expert in the field. Also, based on my knowledge and experience, I understand and know of the capabilities of persons of ordinary skill in the field during the late 1990s to the early 2000s, and I taught, participated in organizations, and worked closely with many such persons in the field during that time frame.

As part of my independent analysis for this declaration, I have considered the following: the background knowledge/technologies that were commonly known to persons of ordinary skill in this art during the time before the earliest claimed priority date for the ’947 patent; my own knowledge and experiences gained from my work experience in the field of the ’947 patent and related disciplines; and my experience in working with others involved in this field and related disciplines. In addition, I have analyzed the following publications and materials listed on pages 1-2. My analysis and conclusions set forth in this declaration are based on the perspective of a POSITA.

VII. TECHNOLOGY OVERVIEW

A. RFID Systems

1. Transponders

32. In an RFID system, a transponder or tag attached to an object interacts with an RFID reader to communicate identification (ID) data. In some examples the communication facilitates identification and tracking. The reader emits radio waves, creating an electromagnetic field that powers the tag if it is passive, or communicates with an active tag that has its own power source. Once activated by the reader, the tag's integrated circuit (IC) modulates and sends back a radio frequency (RF) signal carrying its unique identification data to the reader. The reader then decodes this signal into identification (ID) data and sends the data to a computer system for processing. RFID systems operate in various frequency bands, each suited for specific applications, ranging from inventory management to access control and asset tracking.

2. Readers

33. In an RFID system, the RFID reader is a critical component that communicates with RFID tags for various data transfer applications, e.g., identify and track objects. The reader emits radio waves through its antenna, generating an electromagnetic field that powers passive tags or communicates with active tags that have their own power sources. When a tag enters the reader's range and receives the electromagnetic field, it transmits its unique identification data back to the reader. The reader's antenna receives this RF signal, and the reader then decodes the identification (ID) data and sends it to a computer system for further

processing. RFID readers can operate in various frequency bands, such as low frequency (LF), high frequency (HF), ultra-high frequency (UHF), and microwave, each suitable for different applications for example, inventory management, access control, and asset tracking.

3. Signaling Attributes

34. The signaling attributes of an RFID system encompass the data, communication protocols, and methods used to transmit data between RFID readers and tags. These attributes include frequency bands, modulation techniques, and data encoding methods. RFID systems operate in various frequency bands such as low frequency (LF), high frequency (HF), ultra-high frequency (UHF), and microwave, each with different range and interference characteristics. Modulation techniques, like amplitude shift keying (ASK), frequency shift keying (FSK), and phase shift keying (PSK), are used to encode data onto the radio waves transmitted by the reader and/or the tag. Data encoding methods can ensure reliable data transfer by defining how binary data is represented on the signal. Together, these signaling attributes determine the efficiency, range, and reliability of communication in RFID systems, making them suitable for diverse applications like various applications, e.g., inventory management, access control, and asset tracking.

B. Smart Card Technology

35. A smart card is a physical card with an embedded microchip that can store data and communicate information. APPLE-1019, 4-7. The microchip can be either a contact chip which requires physical contact with a reader or a contactless chip which uses RFID to communicate with a reader. *Id.* Some cards include multiple technologies on a common plastic card. *Id.* Some cards include a single chip with both communication technologies (contact and contactless). *Id.* These cards allow a single device to implement multiple security policies, transaction methods, and authentication types. *Id.* Some example industries utilizing smart cards include cellular cards, mass transit fare cards, ID cards, health cards, and bank cards. *Id.*

VIII. OVERVIEW OF THE '947 PATENT

A. Specification

36. The '947 patent is focused on a "mobile communication device" that is "equipped with hardware and/or software to enable the device to output [] data in a form of a radio frequency signal" using "either an active or a passive RFID

transponder." APPLE-1001, Abstract. This is referred to as an "emulated RFID method"[2] using a "mobile communication device." *Id.*, 2:24-39.

37. Figure 1 shows an example of a system:

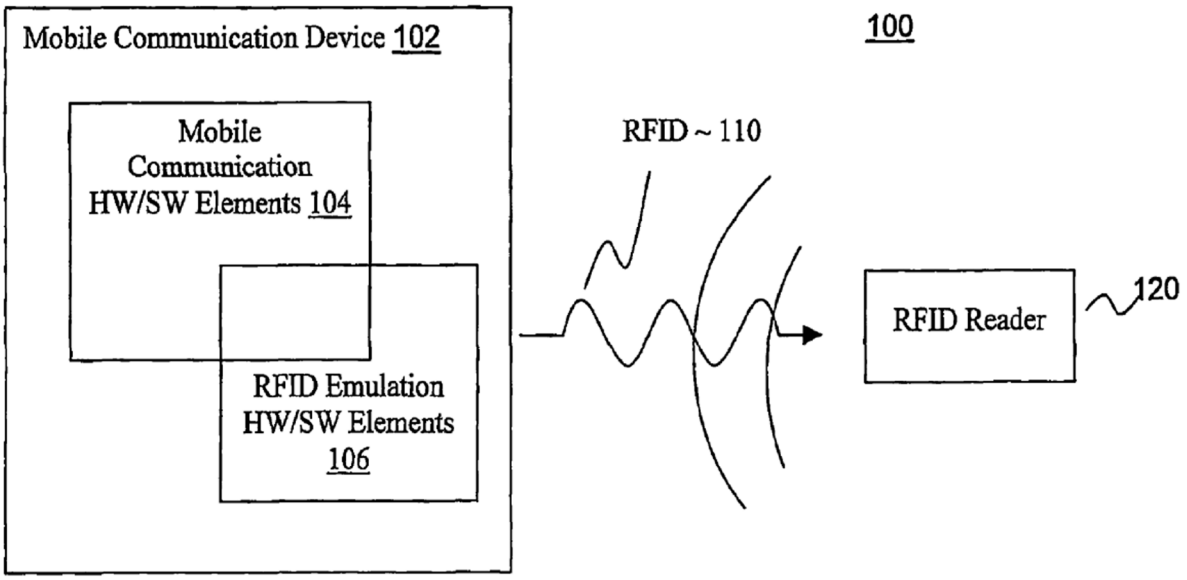


Figure 1

APPLE-1001, FIG. 1

38. Mobile communication device 102 includes hardware and/or software elements 104 for a "primary function" of device 102 to allow a user to "engage in communication with another user of another communication device." APPLE-1001, 3:31-48. Hardware and/or software elements 106 "facilitate provision or

[2] Notably, the claims of the '947 patent do not use the term "emulation" or the phrase "emulated RFID method."

transfer of a key/identifier in a form of radio frequency signal 110, which may be read, e.g., by a radio frequency identifier (RFID) reader 120." *Id.* Further, "in preferred embodiments," "substantial portions of the hardware and/or software elements to provide a RFID, are the same elements employed to facilitate the primary function of device 102, i.e., to facilitate a user in communicating with another user…" *Id.*, 3:50-56. Indeed, these embodiments are described as "advantageously leverag[ing] [] existing elements of mobile communication device 102" to "provide a RFID, emulate[e] a RFID transponder, as well as facilitate[e] user communication." *Id.*, 3:58-63. RFID 110 may be "any keys," e.g., "security keys, such as garage door 'keys'," or "identifiers," e.g., "employee numbers, driver's license numbers, social security numbers, credit card numbers…" *Id.*, 4:1-6.

39. Figure 3 shows components of device 102:

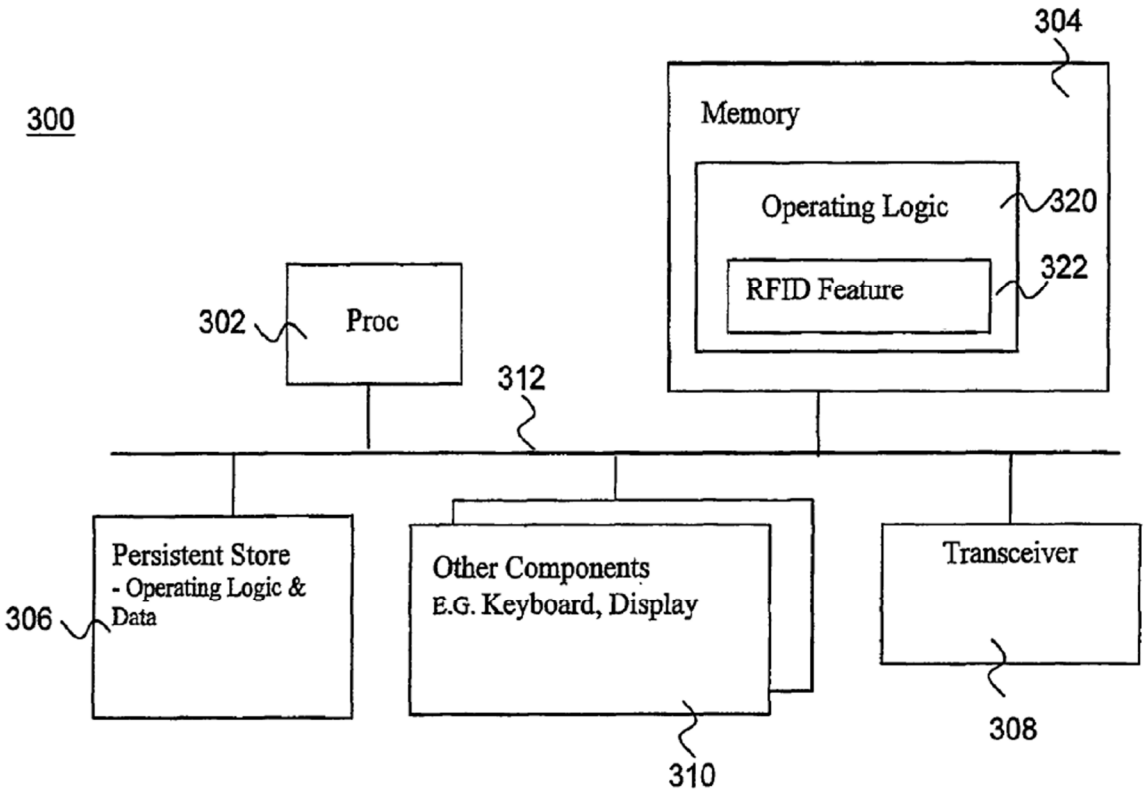


Figure 3

APPLE-1001, FIG. 3

40. Device 102 includes "processor 302, memory 304, persistent store 306, transceiver 308," as well as "other components 310, coupled to each other via bus 312." APPLE-1001, 5:17-22.

41. Figure 4 shows elements of transceiver 308:

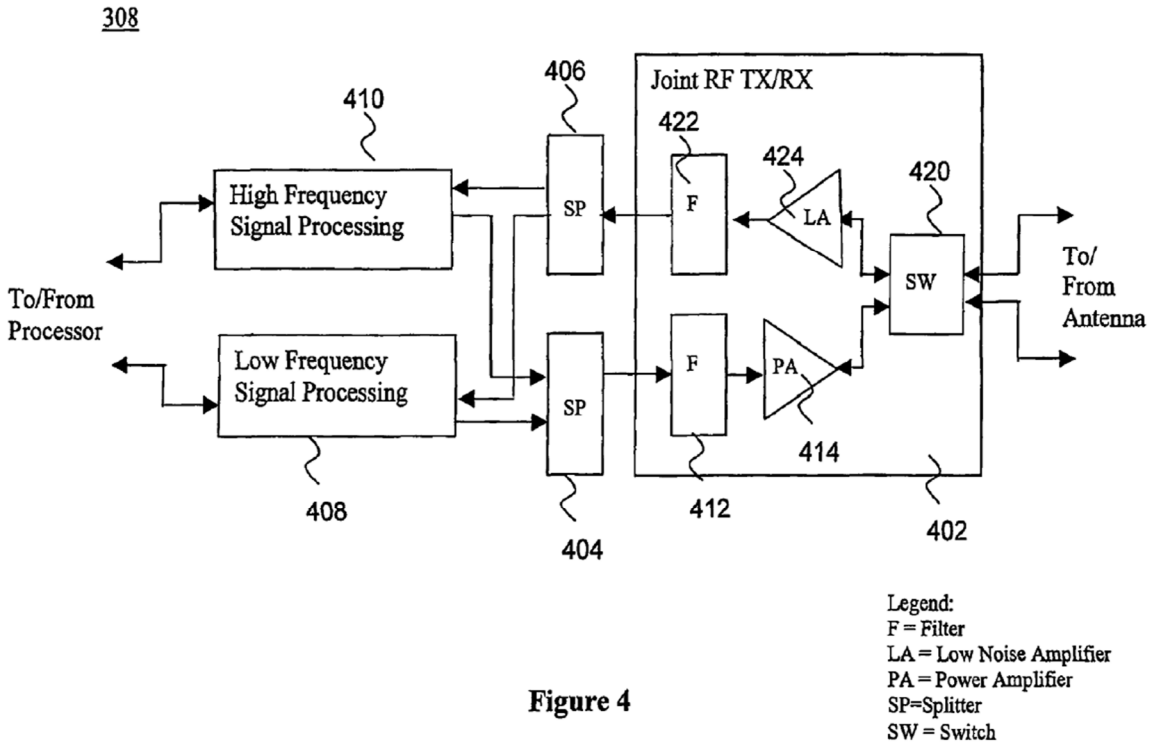


Figure 4

APPLE-1001, FIG. 4

42. Transceiver 308 "includes a joint radio frequency (RF) transmit/receive (TX/RX) section 402, separate signal processing sections 408 and 410 for a range of higher frequencies and a range of low frequencies, switch 404[3] and splitter 406." APPLE-1001, 6:60-67. Additionally, "[f]or transmission, switch 404 switches between the output of high frequency signal processing 410 and the output of low frequency signal processing 408 to the transmit path of joint

[3] Figure 4 incorrectly labels the element identified with reference numeral 404 as "SP." Based on the corresponding description, "SP" 404 in Figure 4 should be identified as "SW" 404. *See* APPLE-1001, 6:56-7:8.

RF TX/RX 402." *Id.*, 7:1-8. High frequency signal processing 410 "performs up and down conversions of the transmit and receive signals of the primary communication function of mobile communication device 102, e.g. the transmit and receive signals of a voice call." *Id.*, 7:17-23. Low frequency signal processing 408 "performs up and down conversions of the transmit and receive signals of the RFID feature, e.g. the output signal of a RFID," which acts as "either an active or a passive transponder, and the received probing signal of a RFID reader." *Id.*, 7:24-30.

B. Prosecution History

43. During prosecution of the '947 patent, the Examiner applied prior art rejections over U.S. Pat. No. 6,771,981 ("Zalewski"), U.S. Pat. No. 2004/0111360 ("Albanese"), and U.S. Pat. No. 6,837,427 ("Overhultz"). *See* APPLE-1002, 227-238, 503-10, 518-34, 546-53, 568-69, 588-99. In allowing the claims, the Examiner identified "the limitations of the independent claims above, including at least the outputting of the RFID signal in response to determining of being in the operational space of the RFID reader based on receipt of the probing signal and outputting the RFID signal and voice call signal in the different radio frequency ranges as set forth in the claims." APPLE-1002, 41.

C. Claim Construction

44. I understand that, for purposes of my analysis in this *inter partes* review proceeding, the terms appearing in a patent claim should be interpreted according to their "ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. § 42.100(b). In that regard, I understand that the best indicator of claim meaning is its usage in the context of the patent specification as understood by a POSITA. I further understand that the words of the claims should be given their plain meaning unless that meaning is inconsistent with the patent specification or the patent's history of examination before the Patent Office. I also understand that the words of the claims should be interpreted as they would have been interpreted by a POSITA at the time of the invention was made (not today). Because I do not know at what exact date the invention as claimed was made, if ever, I have used the Critical Date of the '947 patent as the point in time for claim interpretation purposes. My opinion does not change if the invention date is earlier**.**

45. I also understand from counsel that in a related district court proceeding involving the '947 patent, the parties exchanged proposed claim constructions on 5/2/2024. Counsel has explained to me that the proposed claim constructions (in the table below) are preliminary, and (as the filing of this Petition) the district court has not issued a claim construction order.

46. The prior art discussed in this Declaration satisfies the claim language under either party's interpretation. This is demonstrated by Ground 1A, which applies prior art based on Apple's interpretations, and Ground 1B, which applies prior art based on Varia's interpretations.

Claim Term	Apple's Proposed Construction	Varia's Proposed Construction
"transceiver"	A single component within the mobile communication[s] device that includes common circuitry for transmitting and receiving both RFID and voice signals to/from an antenna	The components responsible for transmitting and receiving signals in a mobile communications device that are integrated into the electronics of the device
"transmitter"	A single component within the mobile communication[s] device that includes common circuitry for transmitting both RFID and voice signals to an antenna	The components responsible for transmitting signals in a mobile communications device that are integrated into the electronics of the device
"communication circuitry"	A single component within the mobile communication[s] device that includes common circuitry for transmitting and receiving both RFID and voice signals to/from an antenna	The combination of circuits responsible for outputting voice call and RFID signals, and receiving RFID signals, that are integrated into the electronics of the device
"switchable mobile communication[s] device"	Mobile communication[s] device configured to switch between an RFID state and a voice call signal state	To the extent the preamble is limiting: mobile communication[s] device capable of changing states

"proximal presence" / "proximal RFID reader"	Indefinite[4]	Plain and ordinary meaning
"operational space"	Indefinite	Plain and ordinary meaning
"on detection of the RFID reader…outputting …second RFID transponder data…"	The [RFID transponder data / RFID signal] is outputted automatically whenever the mobile communication[s] device is within the [operational space / proximal presence] of the RFID reader	Plain and ordinary meaning
"[facilitate / facilitating] the user" / "[facilitate / facilitating] a user"	Indefinite	Plain and ordinary meaning
"u on receipt of the RFID robin signal [sic]"	Corrected to: Upon receipt of the RFID probing signal	

47. In my opinion, the prior art discussed in this Declaration satisfies the claim language under either party's interpretation. This is demonstrated by Ground 1A, which applies the prior art based on Apple's interpretations based on

[4] I understand that indefiniteness is a legal concept, and counsel has explained to me that indefiniteness is outside the scope of IPR proceedings. For this Declaration, my analysis of prior art for certain terms is based on Varia's application of plain and ordinary meaning.

the claim language and prosecution history, and Ground 1B, which applies the prior art based on Varia's interpretations.

IX. SUMMARY OF RELEVANT PRIOR ART

A. Grounds 1A, 1B

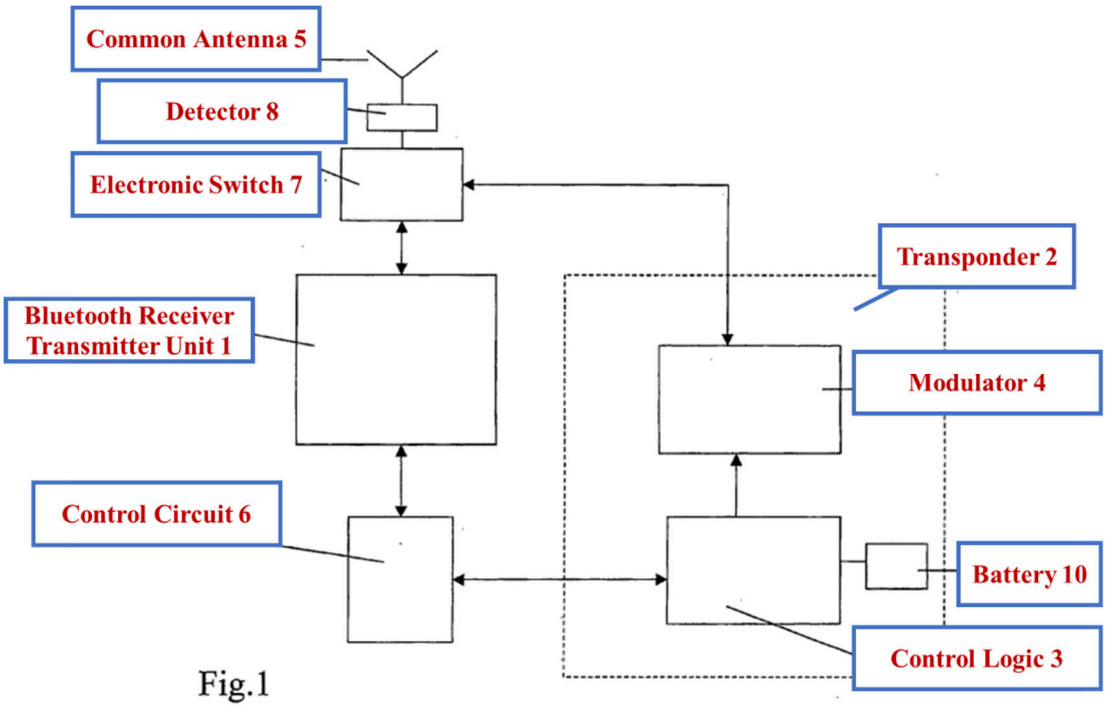
1. Overview of Willgert

48. Willgert is generally directed to a "communications unit for identifying objects or persons." APPLE-1004, Abstract. The communications unit includes a "receiver/transmitter unit" operable with a "Bluetooth communications system," as well as a "transponder" operable with an "RFID system." *Id*.

49. Willgert recognizes that "it is often necessary for a user to have access" to Bluetooth and RFID communications for "different applications," but such configurations "result[] in higher costs than when only one of the systems is used." APPLE-1004, [0008]. It is also "troublesome for a user to carry two systems on his/her person." *Id.* To address this problem, Willgert proposes "provid[ing] a solution…that significantly lowers the costs and affords simpler handling." *Id.*, [0009]. The solution is embodied in the "communications unit" being "integrated" within a mobile telephone, thereby enabling Bluetooth and RFID transmission by the same mobile telephone. *Id.*, [0010]. The transponder and receiver/transmitter unit are "integrated" within the communications unit to

"enable components associated with the receiver/transmitter unit to be used also for transponder operation." *Id.*, [0010].

50. Figure 1 shows one example of a communications unit:



APPLE-1004, FIG. 1 (annotated)

51. The communications unit may be used for "identifying objects or persons," e.g., identifying a person uniquely associated with an identifier. APPLE-1004, [0014]. As shown above, the communications unit includes "[Bluetooth] receiver/transmitter unit 1 in accordance with a Bluetooth system[,]" and "also includes a [RFID] transponder 2 in accordance with a so called RFID system." *Id.*

52. In the example shown in Figure 1, "an electronic switch 7 is included between the common antenna 5 and the specific components of the

receiver/transmitter unit 1 as well as the specific components of the [RFID] transponder 2, respectively." APPLE-1004, [0020]. For transmission of signals, "switch 7 is controlled by the control circuit 6 when transmitting from the communications unit." *Id.*, [0022]. For reception of signals, switch 7 is "controlled by a detector 8 positioned at the antenna 5, and it functions to detect whether a signal received by the antenna 5 is a Bluetooth signal or an RFID signal intended for the [RFID] transponder 2[,]" and "[u]pon completion of this detection, the signal received is sent either to the Bluetooth receiver/transmitter 1 or, alternatively, to the [RFID] transponder 2." *Id.*, [0021]. For instance, "[w]hen a transponder signal is received, the signal will either be reflected by the modulator 4 or, if it is a write signal, it will be decoded in the aforesaid manner and entered into the memory, depending on the design of the transponder." *Id.*, [0024]. Alternatively, "[w]hen the signal received is a Bluetooth signal, a transmitter signal is created in the receiver/transmitter unit 1 and sent to the antenna 5." *Id.*, [0025].

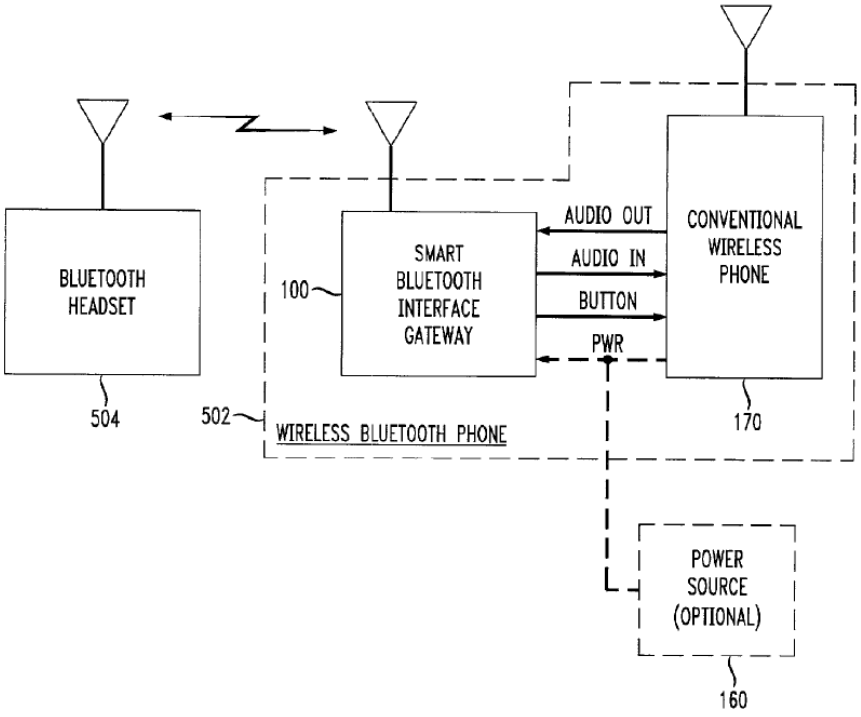
2. Overview of Mooney

53. Mooney describes systems and techniques for enabling an audio connection between a Bluetooth headset and wireless phones, including phones without Bluetooth connectivity. APPLE-1005, Abstract. The audio connection is established through use of a "Bluetooth interface gateway device" that communicates with a "conventional wireless phone (e.g., a wireless phone that

does not have BLUETOOTH installed)." *Id.* Through use of the gateway device, a conventional wireless phone may communicate with the Bluetooth headset in the same manner as, for example, a Bluetooth-enabled wireless phone.

54. Figure 1 shows an example of Bluetooth headset 504 paired with a wireless Bluetooth phone 502 via a smart Bluetooth interface gateway 100 enabling Bluetooth functionality to a conventional wireless phone 170:

FIG. 1



APPLE-1005, FIG. 1

55. "[C]onventional Bluetooth headset 504" communicates "with an otherwise conventional wireless phone 170 by adaptation of the wireless phone into a wireless BLUETOOTH phone 502 by the external connection of a smart

BLUETOOTH interface gateway 100." APPLE-1005, [0039]. Further, Bluetooth headset 504 is described as "conventional," and a POSITA would have understood and found obvious that the Bluetooth headset 504 is configured to similarly communicate with Bluetooth-enabled mobile telephones without necessarily using the smart Bluetooth interface gateway 100. *Id.* For example, in communicating with a Bluetooth-enabled mobile telephone using a Bluetooth connection, the Bluetooth headset 504 is configured to "hear voice and/or tones…generated from the wireless phone []." *Id.*, [0048]. Mooney also describes processes for answering phone calls using a Bluetooth headset. *See, e.g., id.*, [0033], [0047]-[0060], FIG. 3.

B. Ground 2

1. Overview of Holloway

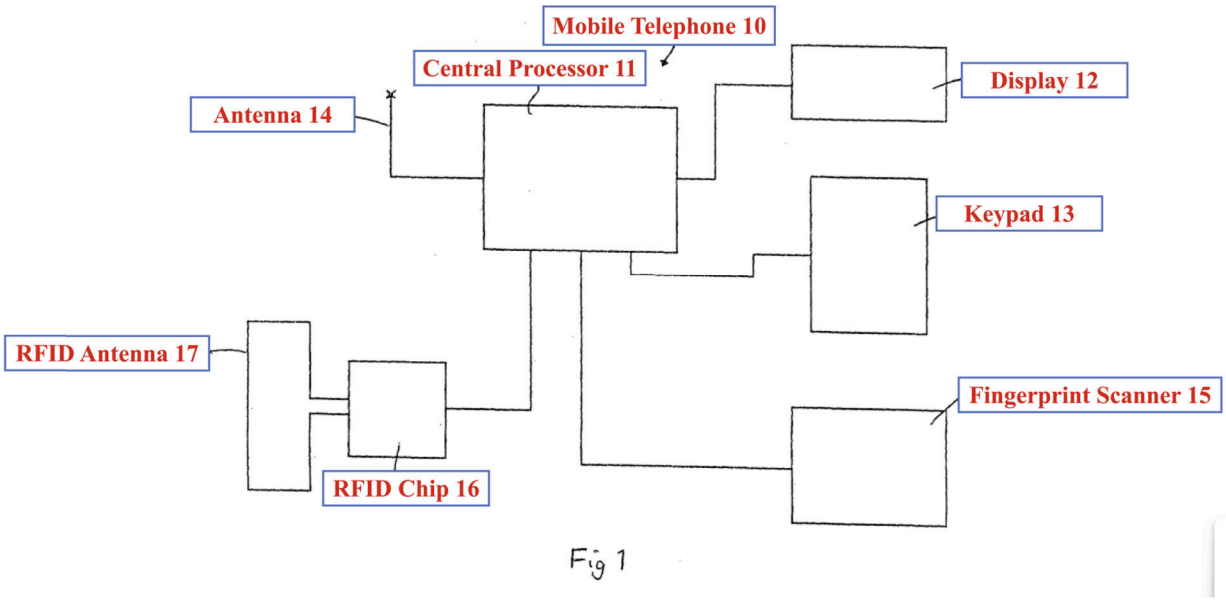
56. Holloway is focused on addressing limitations of traditional "RFID smart cards" that are "used across a wide range of applications," including "mass transit, vending machines, access control and use as an electronic purse." APPLE-1006, 2:15-23[5]; *see id.*, Abstr., 11:16-27. These limitations include (1) the inability to "verify that the user of the card is the true owner," (2) lack of compatibility with

[5] Citations to APPLE-1006 are to PDF page numbers (and not the page numbers identified in the reference).

devices other than "custom device[s]" that are "located either at special cash points or in the user's home," and (3) a requirement for a user to carry "[a] large number of cards." *Id*.

57. In addressing these limitations, Holloway proposes using a mobile telephone that is "fully compatible with existing RFID cards" to replace the use of traditional "RFID smart cards" in the variety of RFID smart card-based transactions. APPLE-1006, 11:16-27; *see id.*, 2:15-23. This is accomplished by "incorporat[ing] the functionality of a number of different cards within the one mobile telephone." *Id.*, 12:5-18; *see id.*, 8:23-9:4, 9:25-10:2. The telephone improves the security of user identity verification through use of "one or more fingerprint scanning means, voice or password recognition means…" *Id.*, Abstr. This allows the telephone to be used "for checking the identity of a user in connection with various transactions." *Id.*; *see id.*, 2:3-4. For example, to support smart card functionality, the telephone includes "memory" for separately storing information for different RFID smart cards. *Id.*, Abstr. This functionality coincides with the storage configurations of multiple RFIDs in the '947 patent. *See, e.g.*, APPLE-1001, 4:63-67; 7:48-56.

58. Figure 1 (annotated below) shows an example of Holloway's mobile telephone.



APPLE-1006, FIG. 1 (annotated)

59. RFID smart card functionality in Holloway's mobile telephone is provided through a "memory" configured to "receive and/or send data via [a] telephone means." APPLE-1006, 3:28-30. The "memory" may store information "corresponding to different smart cards" (*see id.*, Abstr.). This storage configuration "makes it possible to allocate service providers with individual areas for their particular application[,]" and "incorporate the functionality of a number of different cards within the one mobile telephone." *Id.*, 12:11-18. Implementations of this storage configuration may involve use of subdivisions/separations of the "memory." *Id.*, Abstr. ("memory" may be "divided into a plurality of secure areas").

60. Holloway envisions incorporating RFID technology with a mobile phone such that, in some implementations, a shared memory exists for RFID and telephone communications. APPLE-1006, 2:28-30. For example, the telephone may "undertak[e] a local communication [(RFID communication)] using said communications means substantially simultaneously with, before or subsequent to a telephone communication." APPLE-1006, 4:15-18. A user can securely interact with RFID data within the phone using various devices, e.g., external readers, RFID smart cards, another mobile phone, the inputs of the mobile phone, or software within the phone connected to external entities, e.g., a bank. APPLE-1006, 3:1-2, 3:20-27, 6:11-20, 8:1-6.

2. Overview of Pitroda

61. Pitroda is focused on "methods of administering a plurality of client accounts for an electronic transaction device…" APPLE-1007, 1:6-12. An "electronic transaction device" can communicate with "point of sale computers" so that "a person may use a single electronic transaction device to conduct financial transactions to several credit, debit, or deposit accounts, such as accounts normally associated with…banking transactions." *Id.*, 1:13-42. The "electronic transaction device" may be "general purpose hand held computers" that are "programmed to conduct electronic transactions[,]" e.g., those that run "Palm OS or Microsoft Windows CE." *Id.*, 1:43-52. For example, in performing an electronic financial

transaction, a user can "select a credit card account" on an electronic transaction device 12 and then "transmit the account information" to a payment processing device. *Id.*, 7:18-29.

C. Overview of Combinations

62. For the reasons articulated in detail below, and based on my review of the '947 patent, the file history, and the prior art references cited here, it is clear that a POSITA would have readily understood that the teachings of Willgert and Mooney make the elements of claims 1-2, 6-10, 13-17, 25-27 and 32 obvious.

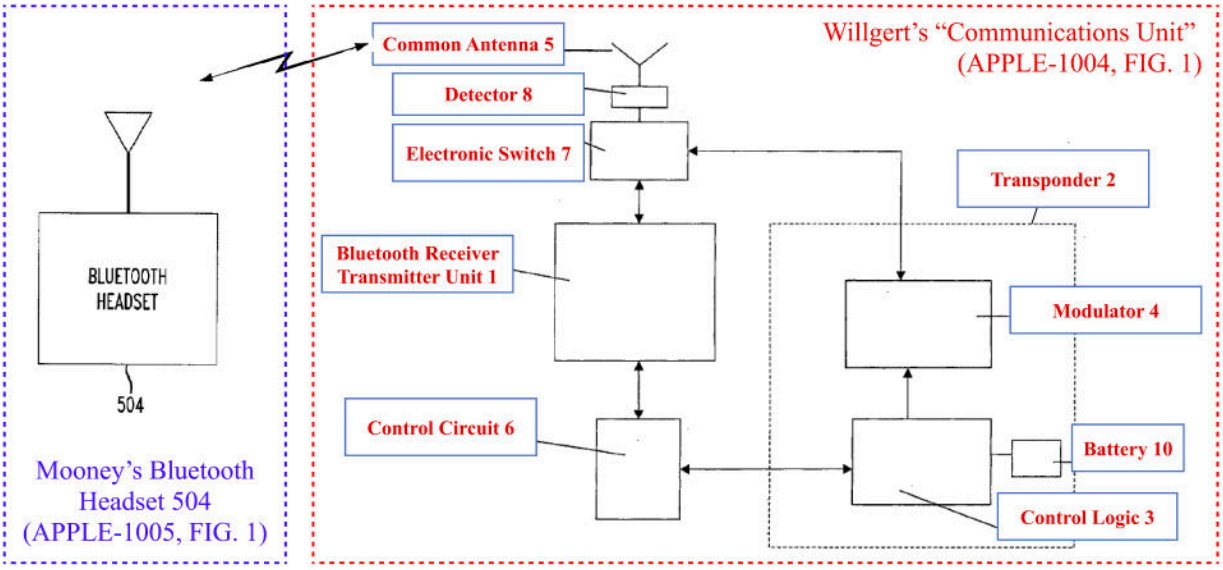
1. Willgert-Mooney Combination

63. Willgert contemplates embodiments in which an RFID transponder is "included in a mobile telephone designed for Bluetooth communication." APPLE-1004, [0030]. In one example, Willgert discloses "[a] design in which Bluetooth and [an RFID] transponder are both integrated in a mobile telephone," which "mak[es] use of Bluetooth communication possible" via the mobile phone. *Id.*, [0032]. A POSITA seeking to implement a mobile telephone having both Bluetooth and RFID communication capabilities as taught by Willgert would have looked to available configurations for mobile telephones that advantageously leverage the "design in which Bluetooth and transponder are both integrated in a mobile telephone . . . for making use of Bluetooth communication." *Id.*, [0032].

64. In seeking these configurations, a common use of Bluetooth was through headsets enabling hands free phone calls. *See generally* APPLE-1006 (Sony Ericson BT headset from 1994). In seeking to implement this functionality in Willgert's telephone, a POSITA would have looked to Mooney, which discloses implementation detail related to the use of Bluetooth connectivity for a mobile telephone and advantages of doing so. Mooney teaches that Bluetooth technology has "permitted the addition of BLUETOOTH functionality and communication between a wireless phone and a wireless headset." *Id.*, [0007]. As discussed in Section X.B.2, Mooney describes a Bluetooth headset 504 providing an audio gateway with an associated Bluetooth phone 502 that allows the Bluetooth headset 504 to "hear voice and/or tones…generated from [a] wireless phone…" *Id.*, [0048]. Mooney further discloses a process (in Figure 3) by which "an incoming call is answered using a BLUETOOTH headset and wireless BLUETOOTH phone including a smart BLUETOOTH interface gateway as shown in FIGS. 1 and 2." *Id.*, [0046]; *see also id.*, [0047]-[0060], FIG. 3.

65. As combined, Willgert-Mooney would have provided a system that includes a mobile telephone (incorporating Willgert's "communications unit") and an associated Bluetooth headset that enables a user of the telephone to conveniently receive and respond to voice calls through use of the wireless headset. *See* APPLE-1004, [0030]-[0032]; APPLE-1005, [0039]. Such a

configuration would have been well-known by the Critical Date because the use of Bluetooth headsets for hands free phone communications was conventional by 1994. *See generally* APPLE-1006. A POSITA would have also been motivated to implement this configuration since Willgert describes "a transponder [being] included in a mobile telephone designed for Bluetooth communication" as a "highly user-friendly application." APPLE-1004, [0030]. Through incorporation of Mooney's teaching, the Willgert-Mooney telephone would have provided an audio connection to a Bluetooth headset, enabling it to "hear voice and/or tones" generated from the telephone, as shown in a modified version of Willgert's Figure 1 below. APPLE-1005, [0048].



Willgert-Mooney

66. A POSITA would have readily recognized that Mooney's headset was a technical implementation of a well-known concept (use of Bluetooth headsets for

voice communications with other Bluetooth-enabled devices, such as a mobile telephone) and thereby can be connected as a compatible companion device to Willgert's Bluetooth-enabled mobile telephone. APPLE-1004, [0008], [0030]; *See generally* APPLE-1006; *see* APPLE-1016. Such a connection configuration would have improved the use of Willgert's mobile telephone since a user would enjoy greater freedom when engaged in audio phone calls (i.e., calls that do not use the phone's internal speaker or microphone) by no longer requiring that the user be manually holding or otherwise physically tethered to the mobile telephone during these calls. Bluetooth headsets were also widely available and used for phone calls in this manner before the Critical Date. *See, e.g.*, APPLE-1006, 2 (describing a "practical headset that connects to a mobile phone by a radio link instead of a cable," which is "the first hands-free accessory to incorporate Bluetooth technology" and "available on the market in mid-2000"); APPLE-1007, 1 (describing a "triple-band GSM phone capable of working in the 900-, 1800-, and 1900-MHz bands" that is "Bluetooth enabled" and can connect to the headset…without needing wires of any sort"). And, Willgert recognizes, such a mobile telephone configuration would have allowed "a user to have access to both systems for different applications" (Bluetooth, RFID) without the "higher costs" associated with having an ID system different from a Bluetooth system and

without having to "trouble[] … a user to carry two systems on his/her person." APPLE-1004, [0008].

67. As discussed above, Willgert-Mooney would have involved incorporating prior art elements according to known methods in a vehicle to yield predictable results. Each of Willgert's mobile telephone and Mooney's Bluetooth headset were well-known by the Critical Date. The combination would have predictably improved user convenience while using a mobile telephone as a multi-purpose device (e.g., telephony, identification). APPLE-1004, [0010]. Further, the combination would have involved use of known aspects of the Bluetooth protocol for a Bluetooth-enabled mobile telephone. *See* APPLE-1006, 2; APPLE-1007, 3.

68. Finally, a POSITA would have reasonably expected to succeed in combining the teachings of Willgert and Mooney. Implementation of the combination would have required only routine knowledge because the addition of Mooney's Bluetooth headset connection to a mobile telephone incorporating Willgert's communications unit would have involved, for example, "[t]he Headset Profile of the BLUETOOTH specification, version 1.1, Part K:6," which "provides the framework for conventional BLUETOOTH communications between a wireless BLUETOOTH phone and a wireless BLUETOOTH headset." APPLE-1005, [0008]. Further, use of Bluetooth protocol to enable the hands-free communication of voice and data between a Bluetooth headset and a cellphone was

conventional by the Critical Date. *See, e.g.*, APPLE-1006, 2 (a "Bluetooth Headset" is a "hands-free accessory to incorporate Bluetooth technology"); *see also* APPLE-1007, 3 (Bluetooth connectivity enables "hands-free communications between a Bluetooth-enabled headset").

2. Willgert Mooney Holloway Pitroda Combination

69. As combined, Willgert-Mooney-Holloway-Pitroda would have incorporated the teachings of Holloway and Pitroda relating to RFID smart cards to further improve Willgert-Mooney. A POSITA would have been motivated to seek these improvements because Willgert and Holloway each similarly express a desire to improve user convenience when using a similar type of device—a mobile telephone with RFID signaling capabilities. *Compare* APPLE-1004, [0009] (discussing benefits of "simpler handling), *and* APPLE-1006, 6:4-16 (discussing "greater flexibility and convenience"). Like Willgert and Holloway, Pitroda also focuses on user action, and does so by specifically discussing a usage scenario involving the same type of mobile telephone in one of the RFID smart card transactions contemplated in Holloway. *See* APPLE-1007, 7:18-40 (describing a RFID-capable mobile telephone being used in a financial transaction).

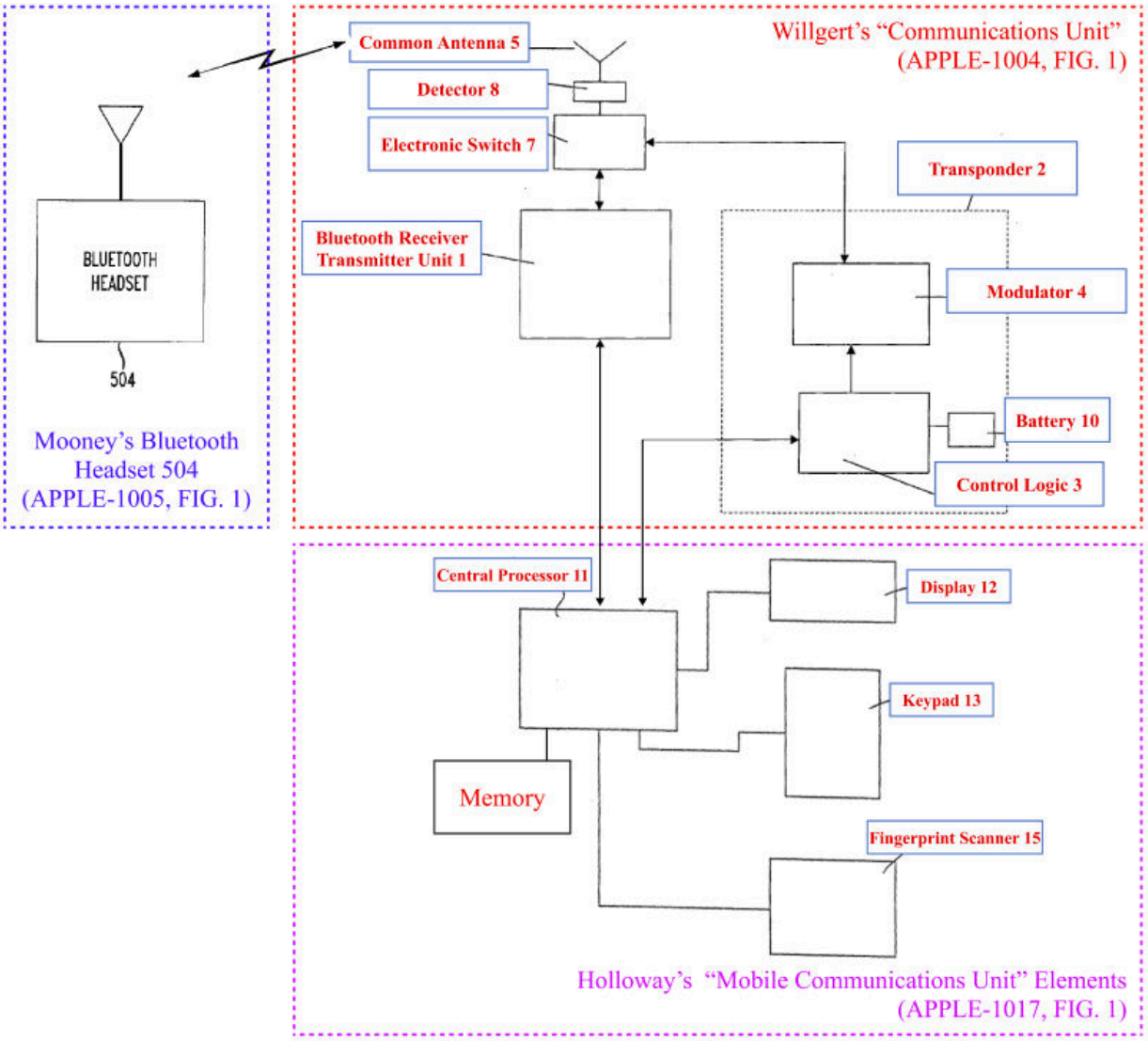
70. Given the overlaps in their disclosures, a POSITA would have sought to improve the RFID capabilities of Willgert-Mooney by incorporating the teachings of Holloway and Pitroda. Specifically, the POSITA would have looked

to Holloway's teaching of using a mobile telephone for use in an RFID smart transaction. APPLE-1006, 10:4-15. The POSITA would have also looked to Pitroda's teaching of enabling a user to select a particular RFID smart card (from among multiple available RFID smart cards stored) for use in the RFID smart card transaction. APPLE-1007, 7:18-40. By combining these teachings, a POSITA would have realized the "real benefit" to the user described in Holloway—a mobile device configuration where the user "no longer has to carry in his wallet a collection of cards that he may rarely use." APPLE-1006, 12:11-18. By combining these features, a POSITA would have understood and found obvious that the features describing multiple RFID smart cards and the selection of those RFID smart cards in Holloway and Pitroda further enable the capabilities of Willgert's transponder that already possess the ability to have RFID transponder data "written into the transponder memory, so that said information can be read-out from the memory later on." APPLE-1004, [0018].

71. To provide the improvements discussed above, a POSITA would have implemented the Willgert-Mooney-Holloway-Pitroda phone to incorporate an improved RFID transponder/tag. This (1) enables the functionality of multiple RFID smart cards (as contemplated in each of Holloway and Pitroda) and (2) enhances the capabilities of Willgert's telephone. *See* APPLE-1004, [0015]; APPLE-1006, 3:1-5; *see id.*, 3:10-12. The phone would also have included logic

(e.g., implemented through Holloway's central processor 11 and/or Willgert's control circuit 6) to provide management of RFID data (e.g., a plurality of RFID smart cards) for various RFID implementations. APPLE-1004, [0019]; APPLE-1006, 3:24-26.

72. One example of Willgert-Mooney-Holloway-Pitroda is shown below:



Willgert-Mooney-Holloway-Pitroda[6]

73. Because Willgert, Holloway, and, Pitroda each describe employing RFID technology through mobile devices, a POSITA would have understood and found obvious that Pitroda's organization of memory storage for each RFID smart card and the input capabilities of the mobile phone could be utilized to improve the user's experience and achieve the goals stated by Willgert and Holloway. In implementing Willgert-Mooney-Holloway-Pitroda, a POSITA would have utilized hardware elements described in Willgert and Holloway, while leveraging the software enhancements described in Pitroda, e.g, the employment of multiple different RFID smart cards through the Willgert transponder using Pitroda's disclosure of user selection.

74. Finally, a POSITA would have had a reasonable expectation of success in combining the teachings of Willgert-Mooney, Holloway, and Pitroda in the manner discussed above. Implementation of the combination with Pitroda would have required only routine knowledge because Holloway and Willgert both teach similar types of devices (mobile telephones) for enabling similar types of communication functionality (RFID communication, telephone communication).

[6] Figure component labels have been added in black font. *See* APPLE-1006, Abstr., 5:21-28.

APPLE-1004, [0014]-[0019]; APPLE-1006, 4:20-5:15. The incorporation of multiple types of RFID smart card functionality into a mobile device (e.g., Willgert-Mooney telephone) also represented a well-known configuration by 12/11/2000 (i.e., Holloway's filing date). *See, e.g.*, APPLE-1006, 2:15-23 ("**For some time** RFID smart cards have been used across a wide range of applications"); *see also id.*, 2:6-13 ("It seems probable that the trend to include yet more functionality within the mobile telephone will continue," e.g., "it would be advantageous to provide secure proximity operation using a mobile telephone"). For example, by at least 2002, combining RFID technology implementations into a single device was practiced in "hybrid cards," which are "a physical medium on which several technologies coexist . . . [to] support different external systems and applications." *Id*. Specifically, the hybrid cards could incorporate "[m]ultiple contactless technologies (125 kHz, 13.56 MHz)" and "both contact and contactless technologies are in the early stages of market deployment." *Id.*

75. Providing RFID technology for multiple applications (e.g., mass transit, credit/debit transactions, and access control, as described in Holloway) was similarly well-known by October 2002 (before the Critical Date). *Id*; *see also* APPLE-1006, 2:15-23. Specifically, "[a]pplications such as logical access to computer networks, electronic payment, electronic ticketing and transit can be

combined with physical access to offer a multi-application and multi-technology ID credential [(smart card)]." APPLE-1006, 2.

76. Additionally, various systems were known to have been capable of simultaneously providing RFID smart card functionality complying with multiple standards, e.g., through backward compatibility. For example, by October 2002, the Smart Card Alliance published a paper indicating that "125 kHz technology" as a "secure and proven technology for access control applications" and "newer contactless technologies," and teaching that "it is possible to include both contactless technologies on a single card" at operating frequency 125 kHz and at operating frequency 13.56 MHz. APPLE-1019, 13, 14, 21-22. Additionally, the "multiple standards" could include the "three primary contactless technologies considered for physical access control applications: 125 kHz, ISO/IEC 14443, and ISO/IEC 15693 technologies." APPLE-1017, 2. The implementation of Willgert-Mooney-Holloway-Pitroda would have been within the skill level of a POSITA without invention. APPLE-1019, 13, 19, 21-22.

X. [GROUND 1A] – Claims 1, 2, 6-9, 13-17, 22, 23, 25, 26, And 30-32 Are Obvious Over Willgert-Mooney

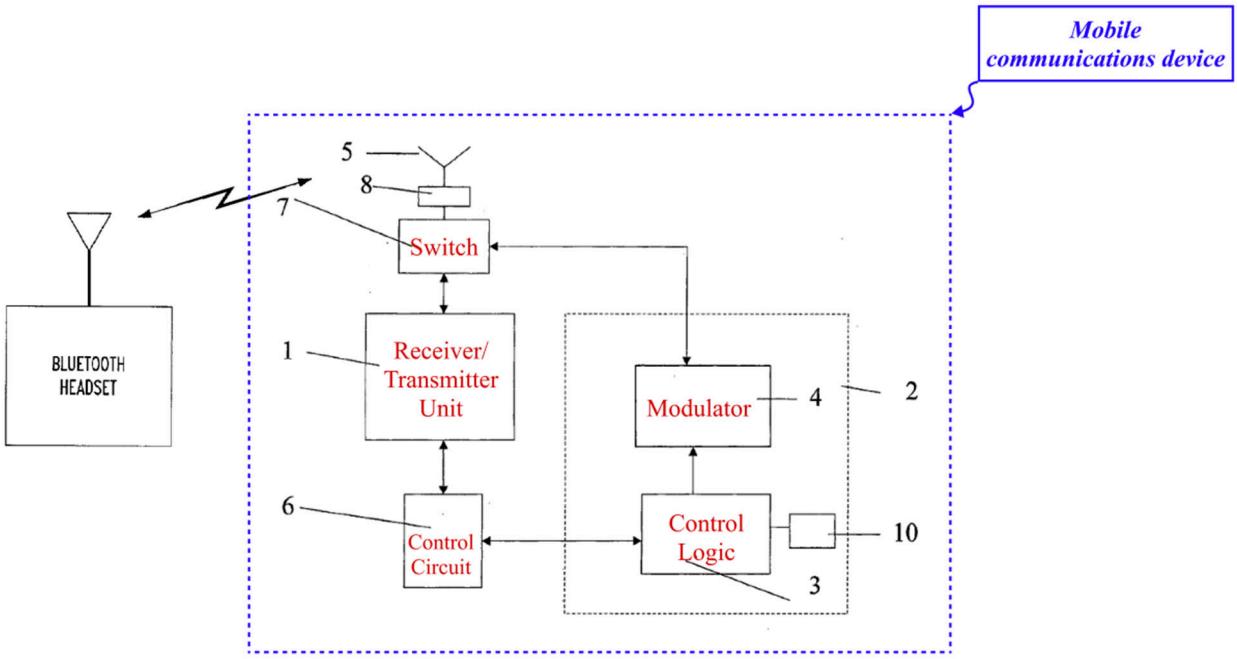
A. Analysis

1. Claim 1

[1.pre] A method for operating a mobile communication device comprising:

77. Willgert-Mooney renders [1.pre] obvious through disclosure of a Bluetooth-enabled mobile telephone (***mobile communications device***). APPLE-1004, [0030], [0032]. As discussed in §IX.A.1, Willgert's "communications unit" includes a "receiver/transmitter unit" operable with a "Bluetooth communications system" (Bluetooth transmitter) and a "transponder" operable with an "RFID system" (RFID transponder). APPLE-1004, Abstract.

78. As explained in §IX.C.1, in Willgert-Mooney, the Bluetooth-enabled mobile telephone is capable of transmitting (a) RFID signals (***RFID communication***) to a communicator, and (b) Bluetooth voice communications between a mobile telephone (***voice call communication***) and a Bluetooth headset. *See* [1.1]-[1.3], *infra*. A POSITA would have understood and found obvious that the communicator at least provides the functionality of an RFID reader since it is configured to receive an RFID signal transmitted by an RFID transponder and decode the received signal to identify a unique identity associated with the RFID transponder. APPLE-1004, [0017], [0018].



Willgert-Mooney

[1.1] receiving, by the mobile communication device, a radio frequency identification (RFID) probing signal from an RFID reader external to the mobile communication device;

79. As explained in §IX.C.1, in Willgert-Mooney, a Bluetooth-enabled mobile telephone includes an RFID transponder 2 and associated functionality to "receive a signal sent by a communicator…" APPLE-1004, [0004]. RFID transponder 2 includes "control logic 3 and an associated memory and modulator 4" and is "adapted to receive a query signal sent from a suitably known communicator." *Id.*, [0017]; *see id.*, [0023]. Using RFID transponder 2, the Bluetooth-enabled mobile telephone (***mobile communications device***) ***receiv[es]*** a query/transponder signal (***radio frequency identification (RFID) probing signal***) from a communicator (***RFID reader***) near the telephone (i.e., ***external to the***

mobile communication device). APPLE-1004, [0005] (describing that a communicator may be "at a given short distance, for example of five meters").

80. The term "probing signal" is referenced two times in the '947 patent specification. *See* APPLE-1001, 5:8-14, 7:24-30. Specifically, "device 102 monitors for probing signals of an intended RFID reader 120…to determine whether device 102 is within the operational space of such a RFID reader 120," and on such determination, "device 102 outputs the designated RFID automatically." *Id.* 5:8-14. Additionally, "signal processing 408" of "transceiver 308" can be "either an active or passive transponder, and the received probing signal of a RFID reader." *Id.*, 7:24-30.

81. The query/transponder signal used in Willgert-Mooney correspond to a ***probing*** signal based on the descriptions in the '947 patent for various reasons. First, because the query/transponder signal is used by a communicator to obtain, from the RFID transponder 2, information to determine the "identity" of RFID transponder 2, the query/transponder signal probes the neighboring area in order to discover the potential presence of a RFID transponder capable of generating the identity information it seeks. APPLE-1004, [0005].

82. The query/transponder signal also represents a ***probing*** signal because receipt of the signal by the RFID transponder 2 causes it to perform an appropriate action based on the signal type of the query/transponder signal, e.g., "reflect[ing]

by the modulator 4" if the received signal is a read signal, or "decod[ing]" the signal and entering into memory if the received signal is a write signal (*Id.*). That is, the query/transponder signal instructs the RFID transponder to perform an action, which a POSITA would have understood and found obvious ***probes*** the RFID transponder 2 to perform a corresponding action.

83. In my opinion, a POSITA would have understood that an RFID-based identification system (such as that described in Willgert) uses communication between the RFID reader and the RFID tag (transponder). *See* APPLE-1004, [0004], [0005]. The reader initiates this communication by sending out a "probing" signal, which represents a radio frequency signal that activates the RFID tag. This signal "probes" the environment to detect and power up passive RFID tags, allowing them to respond by transmitting their stored data back to the reader. Without this probing signal, passive RFID tags (which were understood to be RFID tags without their own power source), would not be able to send their identification data.

84. Additionally, information specified by the signal (e.g., "read" signal, "write" signal) interacts with control logic 3 of the RFID transponder 2. Upon receiving a signal, RFID transponder 2 "modulat[es] the signal with a pulse train" and "[i]nformation relating to the pulse train is stored in the memory. *Id.* Further, "[t]he modulated signal may contain various types of information." *Id.* Signal

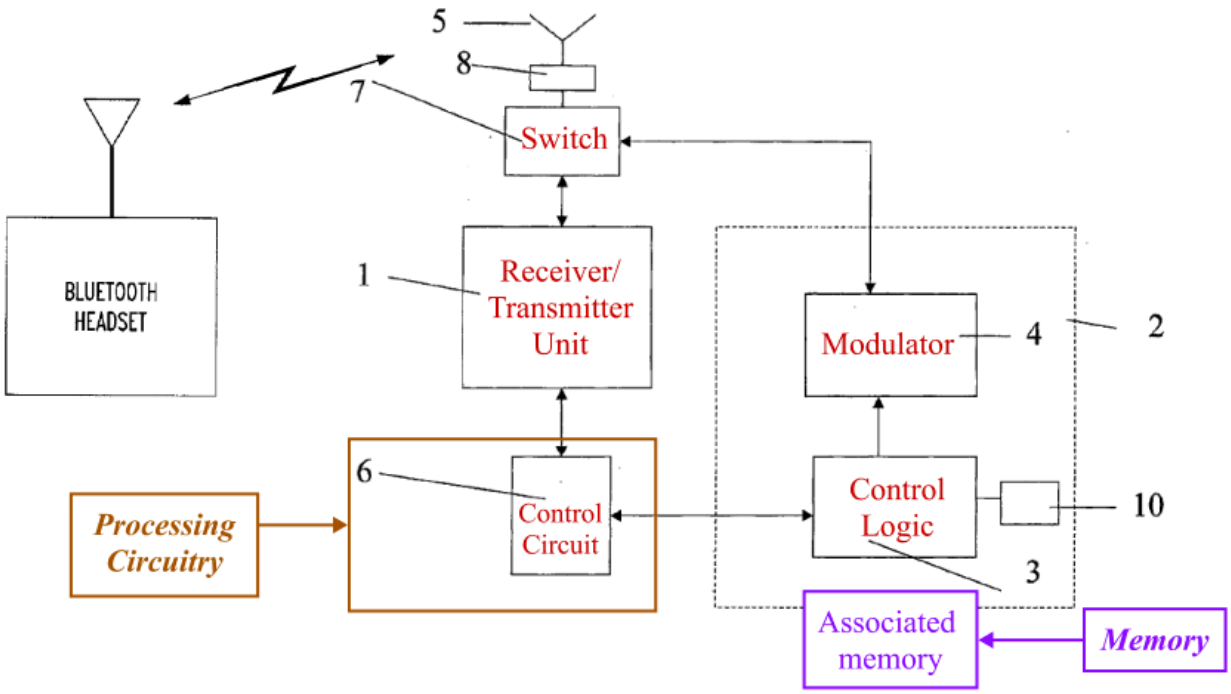
information thereby interacts with control logic 3 of the RFID transponder 2 to identify a signal type (read, write). The information represents an instruction to the RFID transponder 2, e.g., to identify the type of signal prior to performing a responsive action.

[1.2] executing, on processing circuitry in the mobile communication device, instructions stored in a memory in the mobile communication device,

85. In Willgert-Mooney, signal transmission functionality of the "communications unit" is controlled by control circuit 6 (***processing circuitry***). APPLE-1004, [0022]; *see id.*, [0019]. A POSITA would have understood that, in mobile telephones, certain implementations of such signal transmission functionality may be provided using a processor that executes software ***instructions*** stored in a separate associated memory (***memory***). Compared to hardware-based signal processors (e.g., implemented in circuitry), software-based processors would have provided greater flexibility in the context of the Willgert system, since the functionality of software-based processors may be updated over time through software updates (whereas functionality of hardware-based signal processors are preset). *Id.* Indeed, software-based processors for controlling signal transmissions of the "communications unit" of Willgert-Mooney were well-known by the Critical Date. For example, by the Critical Date, Schlang (APPLE-1012) disclosed "dual band mobile station" configured to "switch[] between transmission

and reception in either of the two bands…" APPLE-1012, Abstract. In Schlang's "dual band mobile station," a "microprocessor 112 controls the overall operation of the mobile station through software programs stored in the program memory 114." *Id.*, 13:1-12; *see also id.*, 12:14-20, FIG. 9. Further, an "RF section 120" of a transceiver includes "two frequency synthesizers" with settings "controlled by the microprocessor 112." *Id.*, 13:21-36.

86. The configurations of logic circuit 6 discussed above would have been implemented with associated memory (***memory***) for storing ***instructions*** to control the communication functionality of RFID transponder 2. APPLE-1012, 13:1-12 ("microprocessor 112 controls the overall operation of the mobile station through software programs stored in the program memory 114"). APPLE-1004, [0004], [0006], [0007], [0015], [0017]; APPLE-1011, [0006].



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87. Generally, in software-based signal processor configuration, instructions are typically stored in a separate, associated memory component, such as RAM or flash memory. The processor, guided by these stored instructions, manages the transmission and reception of signals, as well as other operational functions of the mobile phone. This separation of the processor and memory allows for flexibility in software updates and enhancements, enabling more advanced signal processing capabilities without needing to modify the hardware.

88. In the software-based signal processor configuration discussed above, at least some of the memory in communication with the processor would have been configured to store data associated with RFID transponder 2. Such configurations

would have improved the transmission control capabilities of the "control unit," e.g., by enabling memory access to RFID data after the detection of a signal from an RFID reader. *Id.* This configuration is consistent with Willgert, which describes RFID transponder 2 including "associated memory" that stores "[i]nformation relating to the pulse train" relating to a query signal received from a RFID reader. APPLE-1004, [0017]-[0018]. Further, because RFID transponder 2 is "designed to enable information to be written into the transponder memory" so that the "information can be read-out from the memory later on," a POSITA would have recognized it to be advantageous for the information described in Willgert as being stored in transponder memory to be stored similarly in memory associated with a software-based signal processor. *Id.*

89. A POSITA would have found it obvious to implement communication functionality of a multi-modal receiver/transmitter unit in the software-based signal processor in the manner discussed above. For example, the '947 patent describes a processor implementing such multi-signal type functionality through software and yet does so without providing any implementation details or identification of any impediments in realizing such implementations. APPLE-1001, 5:14-49 (describing processor 302 executing instructions stored in memory 304). In failing to provide any such implementation details/impediments, the '947 patent itself corroborates the ability of a POSITA to use software to implement the multimodal

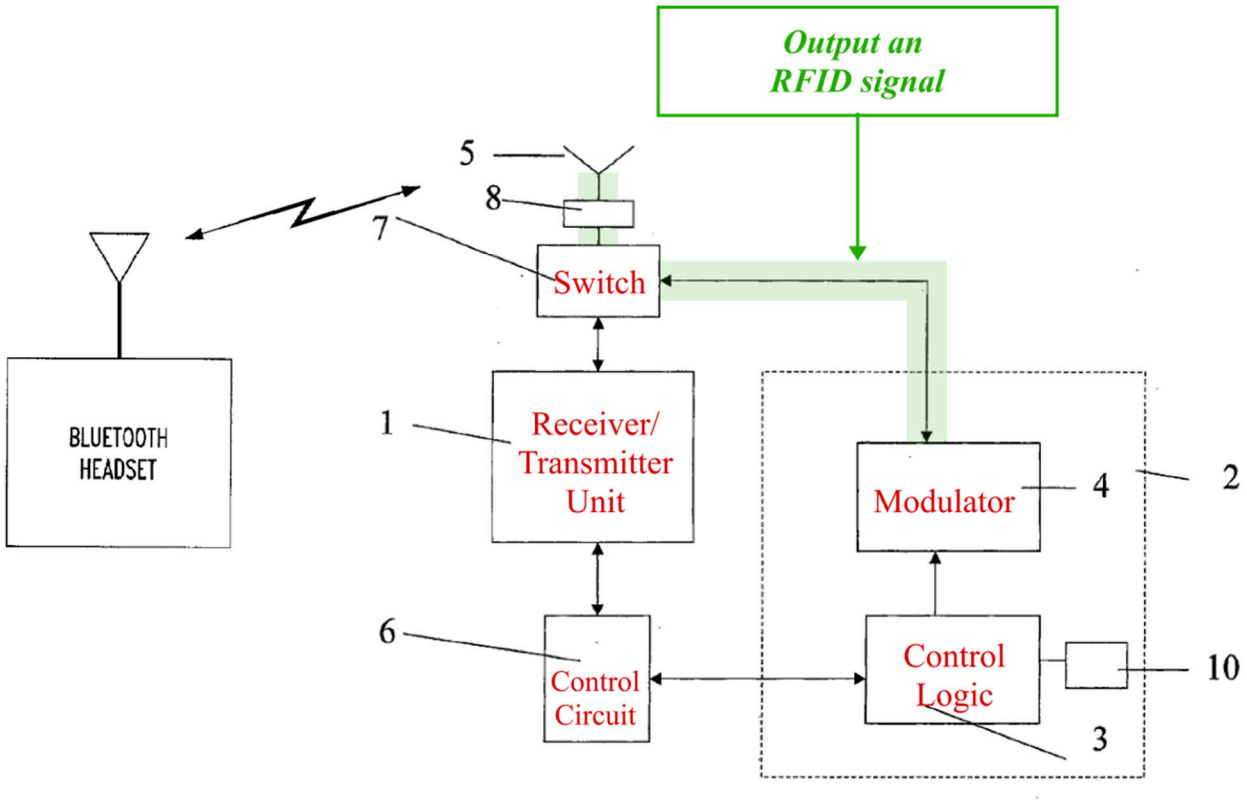
functionality of the Willgert-Mooney communications unit (i.e., to implement that functionality through use of a processor that retrieves and executes instructions and data stored in a memory).

90. I understand that Varia characterized certain terms in various ways during prosecution of related applications. *See, e.g.*, APPLE-1008, 40-41, 91-94, 133-136, 154-157, 196-200; APPLE-1002, 531. For example, Varia asserted that the use of "state" in the claims and specification should be understood such that "the first state is **exclusive** of the second state, and the second state is exclusive of the first state." APPLE-1002, 531. Varia also characterized the claimed ***transceiver*** as a "two state (switching required) transceiver." APPLE-1008, 155. As discussed above, the "communications unit" of Willgert-Mooney satisfies these articulations because both the '947 patent specification and Willgert-Mooney teach the same functionality resulting from the switching (i.e., through use of a switch to enable transmission of two different outputs (RFID signals and voice call signals)). *Compare* APPLE-1004, [0022] *and* APPLE-1001, 7:5-7.

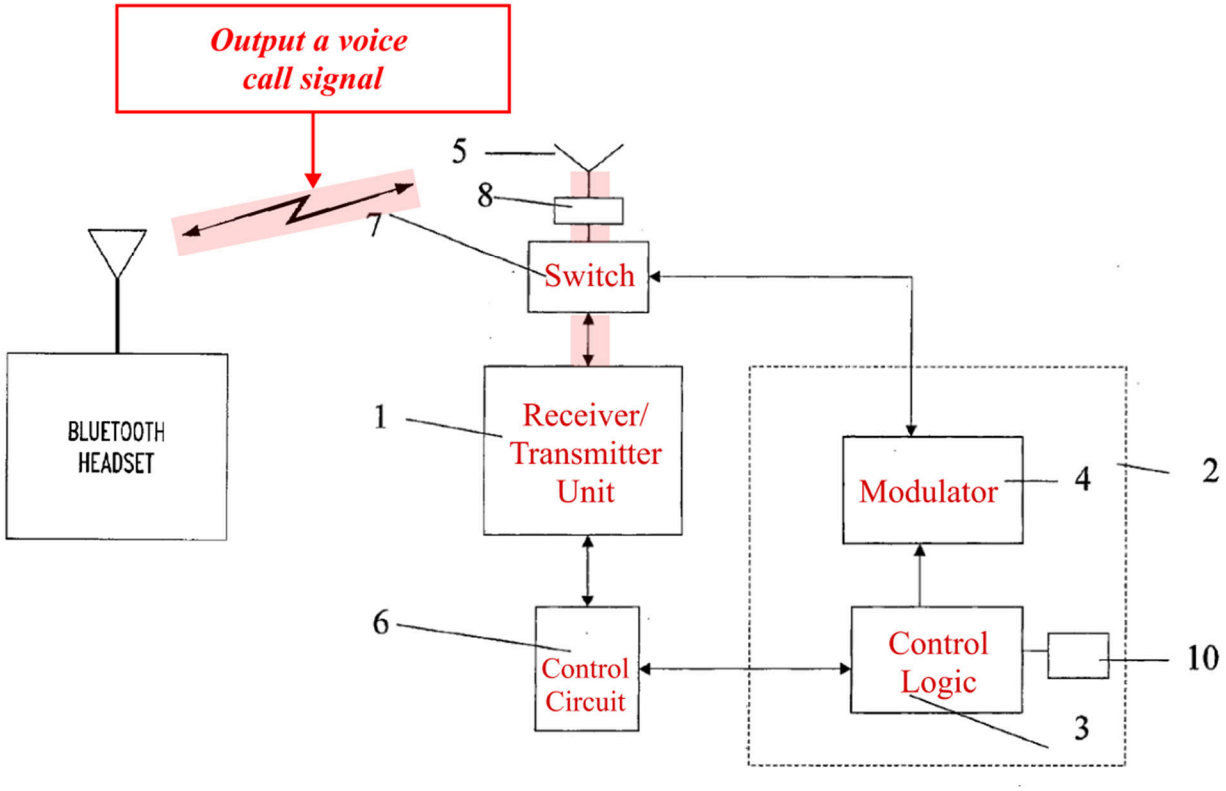
[1.3] the instructions configured to cause the mobile communication device to: output an RFID signal and output a voice call signal,

91. The transmission functionality of the "communications unit" within a Bluetooth-enabled telephone of Willgert-Mooney renders this limitation obvious. The telephone includes common circuitry, e.g., switch 7, detector 8, configured to

output an RFID transponder signal (***output an RFID signal***) and, alternatively, a Bluetooth voice communication signal (***output a voice call signal***). Further, like '947 patent specification's disclosure of a "switch 404" "switch[ing] between the outputs" of a transmitter (APPLE-1001, 7:9-12), Willgert teaches a "switch 7" configured to control "transmitting from the communications unit" (APPLE-1004, [0022]). Both the '947 patent specification and Willgert-Mooney teach the same means of enabling output of two different signal types (i.e., through use of a switch to change transmission output of a transceiver).



Willgert-Mooney



Willgert-Mooney

[1.4] wherein the RFID signal is output in response to the mobile communication device determining the mobile communication device is in an operational space of the RFID reader based upon receipt of the RFID probing signal, and

92. In Willgert-Mooney, RFID transponder 2 of the "communications unit" is configured to determine when it is in sufficient proximity to the communicator (***RFID reader***). APPLE-1004, [0004], [0006], [0007], [0015], [0017]. A POSITA would have understood and found obvious that this determination involves determining that the Willgert-Mooney phone is in ***an operational space*** of the communicator, e.g., the phone is located in an area

surrounding the communicator in which the RFID transponder 2 would be able to receive and respond to a query/transponder signal provided by the communicator.

93. Willgert contemplates using communication between the RFID transponder 2 and the communicator for "reading an identity," which would have involved communication with the "communicator at a given short distance," e.g., "five meters." APPLE-1004, [0005]. At such distances, the RFID transponder 2 would been capable of (1) detecting a query/transponder signal provided by the communicator and (2) responding to the query/transponder signal. *See* APPLE-1004, [0005], [0006]. In the context of the identity verification systems contemplated in Willgert, a determination by the Willgert-Mooney phone of being within a sufficient proximity to a communicator involves the phone being in the ***operational space*** of the communicator.

94. The Willgert system would have been configured such that a mobile telephone is located in an area surrounding the communicator in which the RFID transponder would be able to receive and respond to a query/transponder signal provided by the communicator. This is because the RFID transponder operates within a limited range, typically defined by the strength and frequency of the signal emitted by the RFID reader (the communicator). For the transponder to communicate its stored information to the reader, it must be within the range of the electromagnetic field generated by the reader's signal. This configuration ensures

that when the phone, which contains the RFID transponder, enters this specific area, it can receive the query signal, activate, and then respond with the required identification data. Such a setup is necessary to enable reliable communication and ensure that the system functions as intended for contactless identification or payment scenarios.

95. A POSITA would have also understood and found obvious that RFID transponder 2 may be implemented as a passive RFID transponder, which was a conventional RFID transponder configuration by the Critical Date, as demonstrated by Freund (filed 3/31/2003) (APPLE-1011). In Freund, an RFID transponder is configured to be "activated by an RF signal sent by [a] reader" when "the passive RFID device is in proximity of a reader." APPLE-1011, [0006]. Likewise, RFID transponder 2 may be similarly configured as a passive RFID transponder such that it is activated by a query signal sent by a communicator disclosed in Willgert when the passive RFID transponder is in sufficient proximity to the communicator. *See* APPLE-1004, [0015], [0017].

96. Further, the configuration of the RFID transponder 2 discussed above would have been an obvious based on well-known functionality of RFID transponders. *See generally* APPLE-1011. For example, Freund describes RFID transponder functioning "within inches" or "feet away" from an RFID reader (APPLE-1011, [0006]), which coincides with Willgert's goal of implementing its

communications unit with RFID systems that provide identification within a "geographically limited communications area" (APPLE-1004, [0006]). Because of the well-known and purposefully-designed RFID range limits, A POSITA would also have perceived that Willgert's RFID transponder 2 would employ the same range as conventional RFID and thereby avoid "less suitable" wireless communications where "the communications area is large[]." APPLE-1004, [0007].

97. Based on my review of the '947 patent specification, I do not see descriptions relating to a determination of a first distance at which a probing signal becomes detectable to an RFID transponder and a second distance that is shorter than the first distance at which an RFID signal is permitted to be sent. The most relevant disclosure of "passive" and "active" configurations of RFID transponders is shown in Figure 2 (below) and demonstrates lack of any relationship to determining an "operational space":

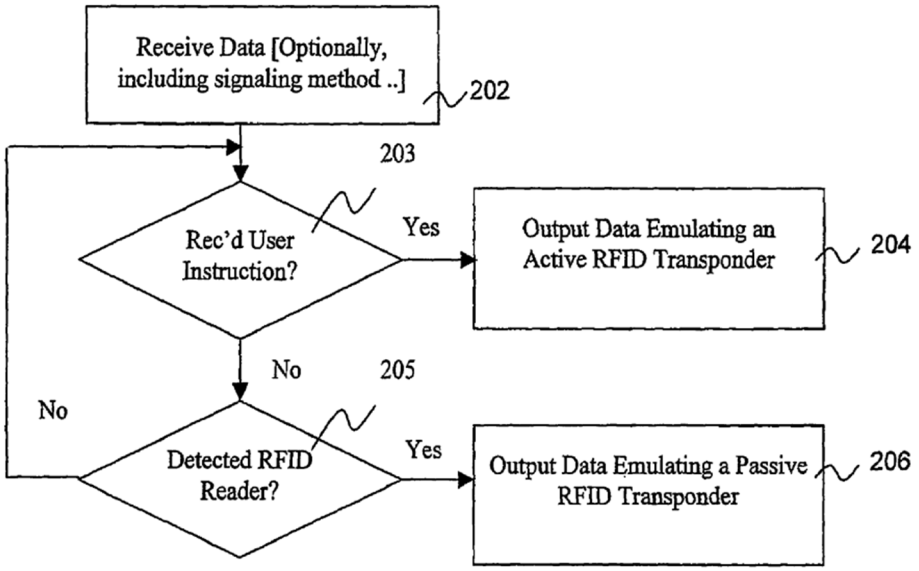


Figure 2

APPLE-1001, FIG. 2

98. In "passive RFID transponder" configuration, a "selected/designated default RFID will be outputted automatically, whenever device 102 is within the proximal presence, or more specifically, the operational space, of an intended RFID reader 120." APPLE-1001, 5:1-13. In this configuration, "device 102 monitors for probing signals of an intended RFID reader 120" to "determine whether device 102 is within the operational space of such a RFID reader 120," then "outputs [a] designated RFID automatically," which acts as "a passive RFID transponder." *Id*. Absent from these descriptions of "operational space," however, there is no other disclosure indicating that their determination involves monitoring

two specific distances from the RFID reader in outputting a "selected/designated default RFID." *See* APPLE-1002, 100-102, 348-351.

[1.5] wherein the voice call signal is output over a wireless network and within a radio frequency range that is different than a radio frequency range used to output the RFID signal.

99. As discussed for [1.3], the Willgert-Mooney telephone includes a Bluetooth transmitter 1 configured to provide a Bluetooth voice communication signal to a Bluetooth headset. Further, in using the Bluetooth protocol to establish a connection between the telephone (which incorporates the "communications unit") and the Bluetooth headset, the established connection would have formed over a piconet wireless network (***voice call signal is output over a wireless network***), which Mooney teaches may be "commonly referred to as a BLUETOOTH piconet" that "provides peer-to-peer communications over short distances." APPLE-1005, [0004].

100. Further, it would have been obvious that Bluetooth transmitter 1 and RFID transponder 2 are configured to transmit signals of different frequency ranges. Mooney teaches that "[t]he wireless frequency of the piconets may be 2.4 GHz as per BLUETOOTH standards, and/or typically have a 20 to 1000 foot range." APPLE-1005, [0005]. Likewise, around January 2002, Bluetooth was known to "use[] the unlicensed ISM band," which includes frequency ranges between "2.4000" GHz and "2.4835" GHz worldwide. *See* APPLE-1013, 23. In

contrast, the frequency range for "the vast majority of [RFID] transponders" was "in the 13.56 MHz" range, whereas the frequency ranges of "passive" RFID transponders was "less than 135 KHz range." *Id*., 20. A POSITA would have found it obvious that, in implementations of Willgert-Mooney, the "communications unit" is configured such that RFID transponder 2 outputs RFID transponder signals in the frequency range around 13.56 MHz or less than 135 KHz (***a radio frequency range used to output the RFID signal***). Further, Bluetooth voice communication signals are output in the frequency range of 2.4000-2.4835 GHz (***within a radio frequency range that is different***). *See* APPLE-1013, 23. Further, dual-band transceivers configured to transmit signals over non-overlapping frequency ranges were conventional by the Critical Date. *See* APPLE-1014, APPLE-1015.

2. Claims 2, 6-8

[2] The method of claim 1, wherein the RFID signal includes RFID data comprising a selected one of a security key and an identifier.

101. In Willgert-Mooney, data output by RFID transponder 2 (e.g., a responsive signal transmitted in response to receiving a query/transponder signal) uniquely identifies the RFID transponder 2 to a communicator (i.e., RFID reader) that provided the query/transponder signal and receives the responsive signal. APPLE-1004, [0017] ("[e]ach RFID transponder will typically have a unique identity that is sent to [a] communicator…"); *see also id.*, [0005] (describing use of

"ID tag[s]" where "[t]he identity can be read by a communicator at a given short distance"). A POSITA would have thereby understood that the responsive signal output by RFID transponder 2 (***RFID data***) includes an identifier (***selected one of…an identifier***) used by the communicator to identify the RFID transponder 2. Further, this coincides with disclosure of examples of "identifiers" in the '947 patent specification that are used to "identify[] the person." APPLE-1001, 1:45-58.

102. It would have been obvious to a POSITA that the Willgert teaches a communication unit to be capable of writing a "security key" to be written into the transponder memory. Specifically, Willgert's "transponder may also be designed to enable information to be written into the transponder memory, so that said information can be read-out from the memory later on, in the aforesaid manner". APPLE-1004, [0018]. A POSITA would have understood and found obvious that the writing of such information into the transponder memory includes the writing of a security key provided by the RFID reader. In view of Willgert's teaching, it would have been obvious to a POSITA that when receiving a RFID signal, the transponder may respond by performing the task "so that said information can be read-out from the memory", where the said information is a security key if the such a read signal is received by the transponder, instead of a read signal for transmitting the transponder identifier.

103. A POSITA reading the claim language would have understood and found obvious that the phrase "a selected one of" does not mean that a user is the one doing the selecting. For example, in claim 5, the language recites "facilitating a user in selecting the RFID data from a plurality of the RFID data using the mobile communication device." In claim 5 the user is clearly defined as the one selecting. Further, when claim 2 is viewed in the context of claim 1, the "RFID signal is output in response to the mobile communication device determining the mobile communication device is in an operational space of the RFID reader based upon receipt of the RFID probing signal" and does not appear to require interaction from a user to transmit. Given that neither claim 1, nor claim 2 mention any user selection or interaction, a POSITA would have understood and found obvious that claim 2 simply recites a list of options for RFID transponder data and one of those options is transmitted.

104. Additionally, RFID-based identification systems (such as the Willgert system) were known by the Critical Date to transmit RFID signals that included a security key and/or an identifier to ensure secure and accurate communication between the RFID transponder and the RFID reader. The identifier typically represents a unique code or number that is associated with the object or person carrying the RFID tag, serving as the core data that identifies the subject within the system. To prevent unauthorized access or data interception, these systems often

incorporated a security key, which is an encrypted piece of data that only authorized readers could validate. The security key was used to authenticate an RFID transponder and ensure that the identifier data was only accessible by authorized systems. This encryption and authentication process provided an additional layer of protection, making it harder for attackers to clone RFID tags or intercept communication. Together, the security key and identifier allowed RFID systems to securely transmit data, balancing the need for both convenience and security in identification applications such as payment systems, access control, and inventory management.

[6] The method of claim 2, wherein the method further comprises facilitating provision of the RFID data to the mobile communication device.

105. In Willgert-Mooney, RFID transponder 2 of the "communications unit" is configured to receive at least two different types of RFID signals from an communicator—a query/transponder (read) signal or a write signal. APPLE-1004, [0023]. This technique enables the well-known ability "to read and write other information from and into the ID tag, respectively, with the said of the communicator [(RFID reader)]." APPLE-1004, [0005]. Specifically, Willgert teaches that "the transponder may also be designed to enable information [(***RFID data***)] to be written into the transponder memory [(***comprises facilitating provision . . . to the mobile communication device***)], so that said information can

be read-out from the memory later on, in the aforesaid manner [(responding to a query/probing signal)]." APPLE-1004, [0018]. A POSITA would have understood and found obvious that when writing into the transponder's memory for the purpose of later reading out in response to a query/probing signal, that the RFID data "written into the transponder memory" comprises information so that the RFID data can later be "read-out from the memory" in response to a query signal. APPLE-1004, [0018]. Further, Willgert teaches that the "write signal is a modulated signal sent by the communicator…control logic 3 includes a decoder, which functions to decode the signal received." APPLE-1004, [0018].

[7] The method of claim 6, wherein facilitating provisioning of the RFID data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID data.

106. As discussed for [6], Willgert teaches that "the transponder may also be designed to enable information [(***RFID data***)] to be written into the transponder memory [(***comprises facilitating provision . . . to the mobile communication device***)], so that said information can be read-out from the memory later on, in the aforesaid manner [(responding to a query/probing signal)]." APPLE-1004, [0018]. A POSITA would have understood and found obvious that, when writing into the transponder's memory for the purpose of later reading out in response to a query/probing signal, the RFID data "written into the transponder memory" comprises at least ***a signaling attribute associated with the outputting of the***

RFID data, so that the RFID data can later be "read-out from the memory" in response to a query signal. APPLE-1004, [0018]. Further, Willgert teaches that the "write signal is a modulated signal sent by the communicator…control logic 3 includes a decoder, which functions to decode the signal received." APPLE-1004, [0018].

[8] The method of claim 1, wherein the mobile communication device is one of a wireless mobile phone and a personal digital assistant equipped with communication capability.

107. In Willgert-Mooney, the "communications unit" is incorporated in a mobile telephone (***selected one of a wireless mobile phone***) equipped with Bluetooth communication capability (***equipped with communication capability***). For example, Willgert describes that the "communications unit" may be implemented in a "mobile telephone designed for Bluetooth communication." APPLE-1004, [0030]-[0031].

3. Claim 9

108. Willgert-Mooney renders the following limitations of claim 9 obvious in the same manner as explained above.

Claim 9 Limitation	Corresponding Claim Limitation
[9.pre]	[1.pre]
[9.1]	[1.2]
[9.5]	[1.5]

[9.2] the instructions configured to cause the mobile communication device to monitor, output an RFID signal, and output a voice call signal;

109. *See* [1.3], *supra* (addressing ***output an RFID signal*** and ***output a voice call signal***). In some implementations of Willgert-Mooney, RFID transponder 2 of the "communications unit" would have functioned as a RFID transponder configured to wait to receive (***monitor***)[7] a signal provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity to the communicator. APPLE-1004, [0004], [0006], [0007], [0015], [0017].

[9.3] wherein the monitoring comprises monitoring for a proximal presence of a radio frequency identification (RFID) reader external to the mobile communication device and determining the mobile communication device is in an operational space of the RFID reader based on an RFID probing

[7] The term "monitor" is used once in the '947 patent specification. APPLE-1001, 5:8-13 ("…device 102 **monitors** for probing signals of an intended RFID reader 120…to determine whether device 102 is within the operational space of such a RFID reader 120."). The '947 patent contemplates a device monitoring for proximal presence of a proximal RFID reader by monitoring for signals sent by the RFID reader. Willgert similarly describes a mobile telephone monitoring for query/transponder signals provided by a communicator in determining that the communicator is close to the telephone. *See* APPLE-1004, [0015]-[0017].

signal received by the mobile communication device from the RFID reader;

110. As discussed for [1.4], in Willgert-Mooney, RFID transponder 2 is configured to determine when it is in sufficient proximity to the communicator (***RFID reader***). APPLE-1004, [0004], [0006], [0007], [0015], [0017]. A POSITA would have understood and found obvious that this determination involves determining that Willgert-Mooney's RFID transponder 2 is in ***a proximal presence*** of the communicator, e.g., the phone is located in an area surrounding the communicator in which the RFID transponder 2 would be able to detect a query/transponder signal from the communicator. As discussed for [1.4], at a "given short distance, e.g., "five meter," RFID transponder 2 would been capable of (1) detecting a query/transponder signal provided by the communicator and (2) responding to the query/transponder signal. APPLE-1004, [0005], *see also id.*, [0006], [0015], [0017]. In the context of the identity verification systems contemplated in Willgert, a determination by the Willgert-Mooney phone of being within a sufficient proximity to a communicator involves the phone being in both the ***proximal presence*** and the ***operational space*** of the communicator. *See* APPLE-1004, [0005]-[0006].

111. A POSITA would have understood and found obvious that RFID transponder 2 may be implemented as a well-known passive RFID transponder.

As explained for [1.4], *supra*, in such a configuration, RFID transponder 2 waits to receive (***monitor***) a query/transponder signal provided by a communicator when the RFID transponder is in sufficient proximity to the communicator. *Id*.; *see* APPLE-1011, [0006]. Further, because the RFID transponder 2 would have been configured to "receive a signal sent by the communicator and [] reflect this signal in the modulated state," the sufficient proximity determination is based on receipt of a query/transponder signal (***RFID probing signal***) from the communicator (***RFID reader***). *See* [1.1], *supra* (explaining that the query/transponder signal used in Willgert-Mooney corresponds to a ***probing*** signal).

112. Additionally, the '947 patent specification references the terms "proximal presence" and "operational space." I understand that, based on Counsel's explanation of Varia's litigation positions, Varia interprets "proximal presence" as the area surrounding an RFID reader in which a conventional RFID transponder will detect an RFID probing signal from the reader. Additionally, I understand that Varia interprets "operational space" as the area surrounding an RFID reader in which either an active or a passive conventional RFID transponder would be able to respond to the RFID probing signal from the reader. I disagree with these definitions because they deviate from the plain and ordinary meaning as understood by a POSITA by the Critical Date. However, to the extent that the proposed definitions are relevant, Willgert's teachings satisfy them.

113. Specifically, the concepts of a first range in which a transponder may detect a probing signal and a second range in which the transponder is physically capable of responding to that signal are not recited in the claim language. There is also no claim language relating to determinations of whether the transponder is within one of these ranges (and not the other). For example, claim 9 of the '947 patent determines both ranges (proximal presence and operational space) using a probing signal. A POSITA would have understood and found obvious that when the transponder and the RFID reader are communicating as designed, that both of these ranges would at least coincide at the time of communication. Any distinction between the proximal presence or operational space is irrelevant for the purposes of understanding the claim because both ranges are determined "based on a RFID probing signal received."

114. Further, a POSITA would have understood and found obvious that the range at which an RFID transponder can communicate (both detect and respond to a signal) is the more frequently used range. For example, when describing the physical range of a 125 kHz transponder, the read/write range is may be 1 meter. APPLE-1019, 14. A POSITA may distinguish between a range in which an RFID transponder can receive a signal and not respond, but would more commonly work with and find useful the range in which two-way communication can be achieved (Patent Owner's operational space). Willgert describes receiving and reflecting

signals from an RFID reader, and POSITA would have understood and found obvious that this disclosure contemplates a range in which two-way communication can occur. APPLE-1004, [0017]. Willgert's contemplated signal transmission encompass the functionality described by Varia for each of the "proximal presence" and "operational space" terms.

[9.4] wherein the outputting of the RFID signal comprises outputting the RFID signal in response to determining the mobile communication device is within the proximal presence of the RFID reader based u on receipt of the RFID robin signal[8]; and

115. As explained above, a POSITA would have understood and found obvious to implement RFID transponder 2 as a passive RFID transponder configured to wait to receive a signal provided by a communicator (i.e., RFID reader) when the RFID transponder is in sufficient proximity to the communicator. APPLE-1004, [0004]-[0007], [0017]; APPLE-1011, [0006]. Further, as discussed for [1.2] and [6.1], RFID transponder 2 is also configured to transmit (i.e., ***output***) RFID signals to a communicator of an RFID system in response. APPLE-1004, [0023], [0030]. For instance, in response (i.e., ***based on***) to receiving a "query signal" (***receipt of the RFID probing signal***), RFID transponder 2 generates and

[8] For this declaration, my analysis interprets "base u on receipt of the RFID robin signal" in [9.4] to mean "based upon receipt of the RFID probing signal."

sends a responsive signal by using modulator 4 to "reflect[]" the received signal or otherwise "send a signal in response to the signal received." *Id.*, [0022]-[0025].

116. In the implementations where RFID transponder 2 is configured in this manner, RFID transponder 2 of the "communications unit" is configured to transmit a responsive signal (***RFID data*** to be received) to a communicator that provided the query signal (***RFID reader***), where the responsive signal is outputted when the RFID transponder 2 is within sufficient proximity to the communicator (***in response to determining the mobile communication device is within the proximal presence of the RFID reader***). APPLE-1011, [0006].

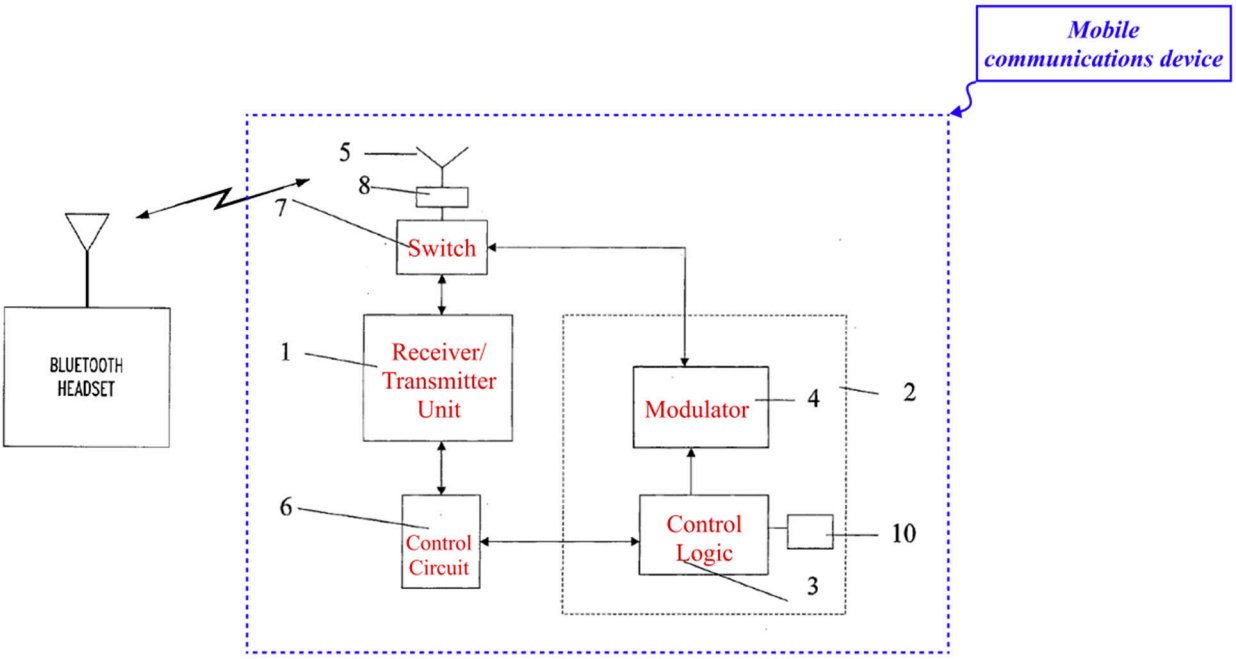
4. Claim 16

117. Willgert-Mooney renders the following limitations of claim 16 obvious in the same manner as explained above.

Claim 16 Limitation	Corresponding Claim Limitation
[16.2]	[1.2]
[16.4]	[9.3]
[16.5]	[9.3]
[16.6]	[1.5]
[16.7]	[1.4]

[16.pre] A mobile communication device comprising:

118. As discussed for [1.pre], in Willgert-Mooney, the "communications unit" is incorporated in a Bluetooth-enabled mobile telephone (***mobile communications device***). APPLE-1004, Abstr., [0030], [0032].

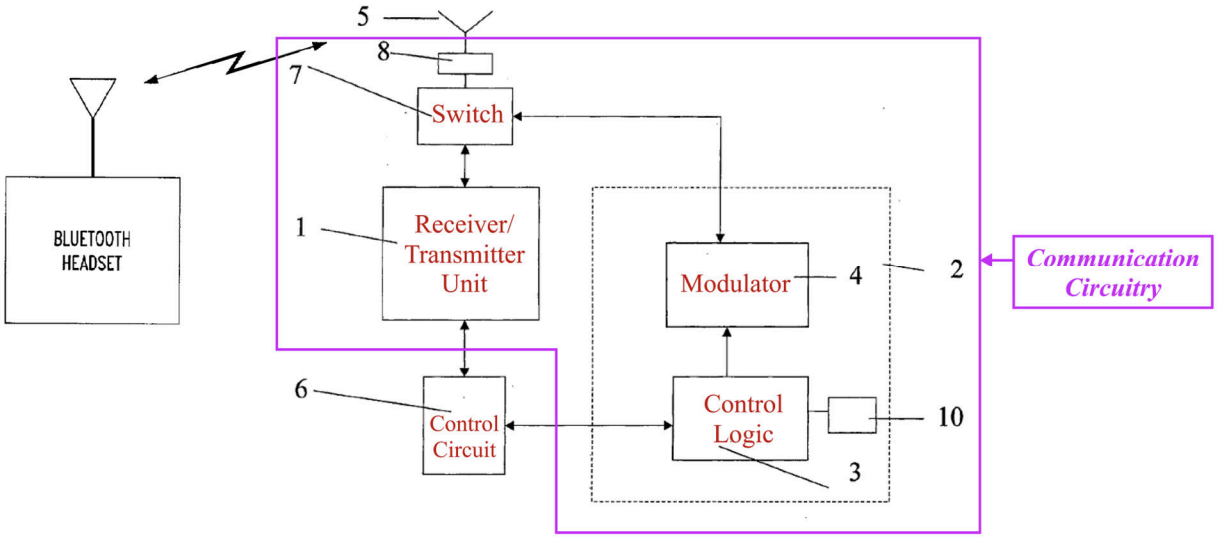


Willgert-Mooney

[16.1] communication circuitry configured to output voice call signals in a first radio frequency range over a wireless network and output radio frequency identification (RFID) signals in a second radio frequency range, which is different than the first radio frequency range;

119. As discussed for [1.3], the "communications unit" of the Willgert-Mooney telephone (***communication circuitry***) includes Bluetooth transmitter 1 and RFID transponder 2 configured to output RFID transponder signals (***output radio frequency identification (RFID) signals***) and Bluetooth voice communication

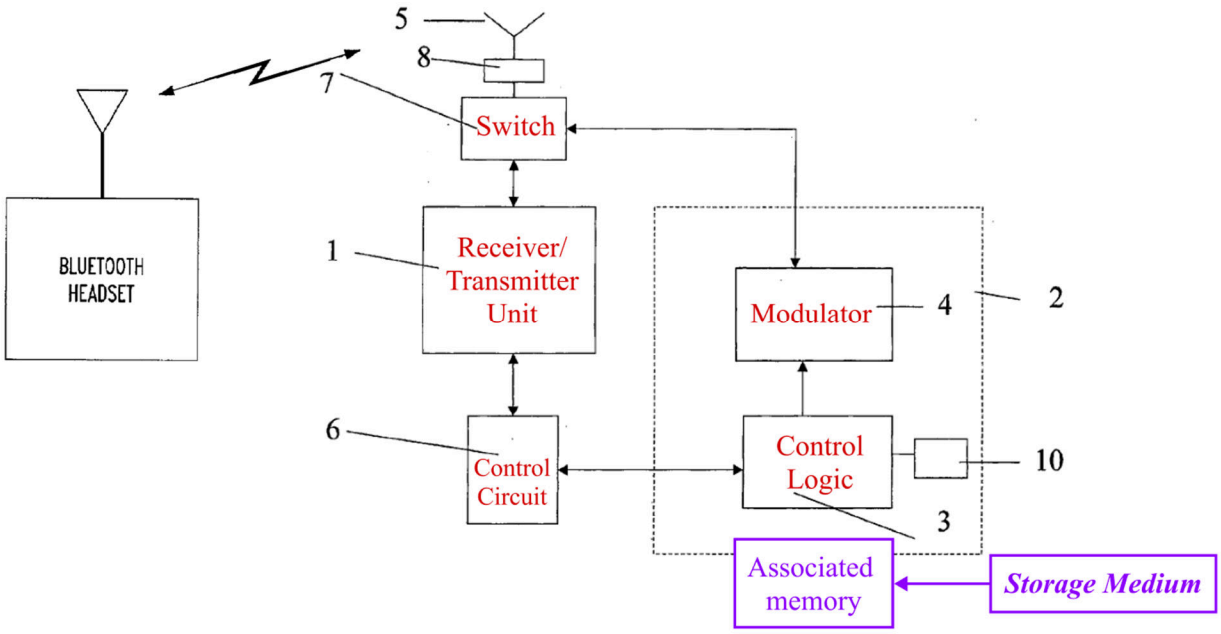
signals (***output voice call signals***), respectively. APPLE-1004, [0022]; *see* APPLE-1001, 7:9-12. Further, as discussed for [1.5], a POSITA would have found it obvious that, in implementations of Willgert-Mooney, the "communications unit" is configured such that Bluetooth voice communication signals are output in the frequency range of 2.4000-2.4835 GHz (***a first radio frequency range over a wireless network***). *See* APPLE-1013, 23. Further, RFID transponder 2 outputs RFID transponder signals in the frequency range around 13.56MHz or less than 135 KHz (***a second radio frequency range, which is different than the first radio frequency range***).



Willgert-Mooney

[16.3] a storage medium including instructions, which, when executed by the processing circuitry cause the mobile communication device to:

120. *See* [1.2], *supra* (addressing ***memory***). In implementations of Willgert-Mooney, logic circuit 6 would have been configured with associated memory (***storage medium***) for storing instructions to control the transmission functionality of RFID transponder 2. Such functionality was conventional before the Critical Date, as shown by Schlang (APPLE-1012). *See* APPLE-1012, 13:1-12 ("microprocessor 112 controls the overall operation of the mobile station through software programs stored in the program memory 114"); APPLE-1004, [0004], [0006], [0007], [0015], [0017]; APPLE-1011, [0006].



Willgert-Mooney

5. Claim 26

121. Willgert-Mooney renders the following limitations of claim 26 obvious in the same manner as explained above.

Claim 26 Limitation	Corresponding Claim Limitation
[26.pre]	[16.pre]
[26.1]	[16.1]
[26.2]	[16.2]
[26.3]	[1.2], [16.3]
[26.4]	[9.3], [16.4]
[26.5]	[9.3], [16.5]
[26.6]	[9.3], [16.7]

[26.7] transmit a voice call signal to another mobile communication device via the communication circuitry at least in part over a wireless network in the first radio frequency range.

122. *See* [1.5], [16.6], *supra*. A POSITA would have understood that voice calls from one mobile device (e.g., a cell phone) are sent to another cell phone (***another communication device***) for communication over the wireless cellular network. Further, as discussed for [1.5], a POSITA would have found it obvious that, in implementations of Willgert-Mooney, the "communications unit" is configured such that Bluetooth voice communication signals are output (***in part***) in

the frequency range of 2.4000-2.4835 GHz (***a wireless network in the first radio frequency range***). *See* APPLE-1013, 23.

6. Claims 13-15, 22, 23, 17, 25, 30-32

123. Willgert-Mooney-Holloway-Pitroda renders the following claims obvious in same manner as discussed above.

Claim	Corresponding Claim
[17]	[2]
[13], [22], [30]	[6]
[14], [23], [31]	[7]
[15], [25], [32]	[8]

XI. [GROUND 1B] – Claims 1, 2, And 6-8 Are Obvious Over Willgert

A. Varia's Statements In The Litigation

124. In the Litigation, I understand that Varia has characterized the scope of certain claim terms. As explained below, Willgert satisfies Varia's proposed constructions and thereby makes claims 1, 2, 6-10, 13, 15-17, 25-27, and obvious based on Varia's constructions.

125. I understand that Varia has identified communication circuitry that includes NXP 67V04 NFC Controller, Qualcomm WTR4905 Multimode LTE Transceiver, and Qualcomm WTR3925 RF Transceiver collectively represent communication circuitry. I further understand that Varia identified internal

circuitry and components, including an NXP 67V04 NFC Controller, Qualcomm WTR4905 Multimode LTE Transceiver, and Qualcomm WTR3925 RF Transceiver. I also understand that Varia interprets the communication circuitry as encompassing circuitry of different components within a mobile device that *collectively* enable transmission/reception functionality of the mobile device. A POSITA would understand this statement suggests a lack of physical or logical constraints in which case its elements are rendered obvious by Willgert's contemplated RFID and voice call signaling functionality within a single Bluetooth-enabled mobile telephone. APPLE-1004, [0014], [0030]-[0032].

B. Analysis

1. Claim 1

126. The application of Willgert within Ground 1B incorporates by reference the disclosures of Willgert relating to the functionality of RFID transponder 2 referenced in Ground 1A (identified below) and thereby render the following claim limitation obvious in the same manner as discussed above.

Claim	Corresponding Section and Evidence
[1.pre]	Ground 1A, [1.pre]; APPLE-1004, [0020], [0022]-[0024], [0030], [0032]

[1.1]	Ground 1A, [1.1]; APPLE-1004, [0004], [0005], [0017], [0023]; APPLE-1001, 5:8-14, 7:24-30
[1.4]	Ground 1A, [1.4]; APPLE-1004, [0004], [0006], [0007], [0015], [0017]; APPLE-1011, [0006]; APPLE-1001, 5:1-13, FIG. 2; APPLE-1002, 100-102, 348-351
[1.5]	Ground 1A, [1.5]; APPLE-1004, [0020], [0022]-[0024], [0030], [0032]; APPLE-1005, [0004], [0005]; APPLE-1013, 20, 23; APPLE-1014; APPLE-1015

[1.2] executing, on processing circuitry in the mobile communication device, instructions stored in a memory in the mobile communication device,

127. As discussed below, implementations of Willgert's "communications unit" satisfy Varia's broad interpretations of various claim terms in the Litigation.

128. I understand that Varia interprets the ***processing circuitry*** (recited in [1.2]) in the context of the transmission configuration (recited in [1.3], i.e., ***output an RFID signal***, ***output a voice call signal***). I understand that Varia argued functionality recited in [1.2] are provided by a combined set of components within the mobile communications device. Based on this, certain implementations of

Willgert's "communications unit" in a mobile telephone (configured to output voice call signals and RFID signals) similarly includes a combined set of components and/or a sum total of circuitry for outputting ***a voice call signal*** and ***a RFID transponder signal***. APPLE-1004, [0030]-[0032]; *see* APPLE-1001, 9:32-36, 10:8-17.

129. Under Varia's interpretation (where the ***processing circuitry*** is not uniquely limited to a particular element), it would have been obvious that some implementations of Willgert's "communications unit" involve use of a single, common processor (e.g., a control circuit 6) for processing all wireless signals (RFID, Bluetooth, voice calls). APPLE-1004, [0019], [0024]. Willgert teaches that the "function of the control logic 3" (associated with Bluetooth) may be "included in the function of the control circuit 6," and control circuit 6 provides signal processing functionality for both Bluetooth signals and RFID signals. APPLE-1004, [0019]. Given this disclosure, a POSITA would have been motivated to configure control circuit 6 as a common processor for handling processing for voice call signals as this configuration would have removed the need for redundant circuitry (e.g., the need for different, dedicated processors) for Bluetooth and voice call signals within a mobile telephone. *See* APPLE-1007, 1 (describing a "triple-band GSM phone capable of working in the 900-, 1800-, and 1900-MHz bands" that is "Bluetooth enabled" and can connect to the

headset…without needing wires of any sort"); *see also* APPLE-1012, 13:1-12 (describing a "dual band mobile station" with a "microprocessor 112" that "controls the overall operation of the mobile station through software programs stored in the program memory 114"). This is also consistent with Willgert's broader disclosure of leveraging the "communications unit" to provide signaling capabilities relating to different types of wireless signals (e.g., Bluetooth, RFID). APPLE-1004, [0031]. Configurations of multi-modal transceivers with circuitry associated with different types of wireless signals were also conventional by the Critical Date. APPLE-1010, 3:22-25, 5:1-12.

130. As explained above, in certain implementations of Willgert's "communications unit" control circuit 6 functions as a single, common processor for processing wireless signals of the telephone and thereby also represents an example of a common or overlapping architecture. In the configurations of Willgert discussed above, processing circuitry associated with the single, common processor of Willgert's "communications unit" (e.g., a control circuit 6) (***processing circuitry***) is configured to execute instructions stored in associated storage (***instructions stored in a memory***) for processing all wireless signals (RFID, Bluetooth, voice calls). APPLE-1004, [0019], [0024], [0031].

[1.3] the instructions configured to cause the mobile communication device to: output an RFID signal and output a voice call signal,

131. As discussed for [1.2], a POSITA would have found it obvious to implement control circuit 6 of Willgert's "communications unit" as a single, common processor for processing wireless signals of a mobile telephone, including transmissions (i.e., ***output***) related to (1) voice call signals (***a voice call signal***) of the telephone and (2) RFID signals (***a RFID signal***). APPLE-1004, [0023], [0024], [0030].

132. As explained above, a POSITA would have configured control circuit 6 to handle processing for voice call signals as this would have removed the need for redundant circuitry for Bluetooth and voice call signals within a mobile telephone. As to RFID functionality, as discussed in § IX.A.1, in response to receiving a "query signal," RFID transponder 2 "send[s] a signal in response to the signal received." APPLE-1004, [0025]. The transmission of the responsive signal enables a communicator (i.e., RFID reader) to read the "identity" of RFID transponder 2, e.g., "at a given short distance," such as "five meters." *Id.*, [0005]; *see also id.*, [0017] ("[e]ach transponder typically have a unique identity that is sent to the communicator…"). For example, as discussed for [1.1] in Ground 1A, a POSITA would have found it obvious that the query/transponder signal includes signal information enabling RFID transponder 2 to identify a signal type (read,

write) and such that the included information represents an ***instruction*** to the RFID transponder 2 to identify the type of signal prior to performing a responsive action. APPLE-1004, [0023].

133. Varia also broadly interprets transmission states relating to each of the signal types recited in [1.3] (***voice call***, ***RFID signal***). As best understood, Varia appears to interpret a "state" as being unbounded such that it encompasses a transmission state in which an associated transmitter may be configured to transmit different signal types (whether sequentially or simultaneously) over a specified time frame (e.g., a state in which a transceiver can transmit either RFID and/or voice call signals). This interpretation finds no support in the intrinsic record of the '947 patent.[9] Nonetheless, implementations of the Willgert's "communications

[9] The '947 patent specification does not reference the term "state." Nor does it teach an example where a transceiver switches specifically from a voice transmission mode to an RFID transmission mode. Instead, it simply discloses a "transceiver 308" capable of transmitting and receiving "signals of a voice call[]" and "signals of the RFID feature, e.g. the output signal of a RFID" as "an active or a passive transponder, and the received probing signal of a RFID reader." *See* APPLE-1001, 6:60-7:35, FIG. 4. But this disclosure lacks detail as to states related

unit" discussed above similarly represent processing circuitry in a mobile telephone according to Varia's interpretation, enable transmission of different signal types (e.g., voice calls, RFID). *See, e.g.*, APPLE-1004, [0014], [0030]-[0032].

134. In one exemplary usage scenario, the configuration of the "communications unit" would have changed as a result of the type of signal being transmitted, e.g., from transmitting voice call signals for output to transmitting RFID signals for output. Indeed, where Willgert's "communications unit" transmits an RFID signal serially after a user completes a voice call using the Bluetooth-enabled mobile telephone, this scenario satisfies Varia's interpretation of [1.3]. As noted in Ground 2, a mobile device configuration for use in this scenario was also well-known by the Critical Date, as shown by Holloway (APPLE-1006). *See* APPLE-1006, 4:15-18 (describing a telephone that may "undertak[e] a local communication [(RFID communication)] using said communications means substantially simultaneously with, before or subsequent to a telephone communication").

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to transitioning from one type of transmission to the other. The operation of switch 404 is the most salient disclosure suggestive of transmission states and associated switching in the '947 patent. *Id*.

2. Claim 2, 6-8

135. The application of Willgert within Ground 1B incorporates the disclosures of Willgert discussed in Ground 1A and makes these claims obvious in the same way.

XII. [GROUND 2] – Claims 2-7, 10-14, 17-24, And 27-31 Are Obvious Over Willgert-Mooney-Holloway-Pitroda

A. Analysis

1. Claims 2-7, 13, 31

[2] The method of claim 1, wherein the RFID signal includes RFID data comprising a selected one of a security key and an identifier.

136. As described in the '947 patent specification, "RFID 110 may be any keys and/or identifiers," including "identifiers, such as employee numbers, driver's license numbers, credit card numbers…, affinity program member identifiers…" APPLE-1001, 4:1-6. As discussed for [2] in Ground 1A (IX.A.1), Willgert describes an ***RFID data compris[ing]*** identification information (***identifier***). APPLE-1004, [0017]. Holloway further identifies scenarios where RFID technology is used through a mobile telephone, including "at passport control points, [to] access to high security buildings or [for] checks on the holders of driving licenses." APPLE-1006, 9:25-10:2. In Willgert-Mooney-Holloway-Pitroda, identification information output by an RFID transponder (***RFID data***) may include a ***security key*** (e.g., information providing "access to high security

buildings") and/or an ***identifier*** (e.g., information representing a "driving license[]"). *Id.*; *see* APPLE-1001, 1:45-58.

137. To the extent that ***selected one*** in [2] is deemed to require user selection, it would have been obvious that a phone provided by Willgert-Mooney-Holloway-Pitroda is configured to output, via an RFID transponder, identification information (***RFID data***) based on a user selection (***selected one***) of a particular RFID smart card from amongst the different types of RFID smart cards described in Holloway, including information providing "access to high security buildings" (***security key***), or information representing a "driver license[]" (***identity***). APPLE-1006, 9:25-10:2.

138. Specifically, Holloway's mobile telephone "provides a means to carry out normal day to day credit/debit purchases," which a POSITA would have understood may be accomplished through, e.g., user selection between a credit card and a debit card for use in an RFID smart card transaction. APPLE-1006, 7:28-32, 10:4-15; APPLE-1007, 7:16-38, 8:18-29. This implementation detail is consistent with Holloway's teach of telephone 10 as "incorporat[ing] the functionality of a **number of different cards** within the one mobile telephone." Holloway also supports a POSITA's understanding of this implementation through various teachings relating to display and user input mechanisms for supporting RFID smart card-based financial transactions provided by the telephone. *See, e.g.*, APPLE-

1006, 9:1-6 (displaying "credit card number and expiry date" associated with a transaction), 7:22-26 ("the user is able to operate [the telephone] for any payment application, just like with an RFID smart card…"), 8:14-24 (in performing a transaction using the telephone, the user may "enter the amount to be paid").

[3] The method of claim 2, wherein the security key comprises a selected one of a garage door key, an exterior door key, an interior door key, and a motor vehicle door key.

139. As discussed for [2], the Willgert-Mooney-Holloway-Pitroda telephone would have allowed RFID technology to be used in the scenarios described in Holloway, including "at passport control points, [to] access to high security buildings or [for] checks on the holders of driving licenses." APPLE-1006, 9:25-10:2. A POSITA would have found it obvious that "access to high security buildings" within Holloway may involve, e.g., providing access to a building through an exterior door by transmission of RFID data including an access credential (***exterior door key***) to an RFID reader associated with the door. Indeed, RFID-based access control systems were well-known by the Critical Date. *Id.* (citing APPLE-1019, 8, describing an "access control system" where an RFID smart card is "presented to a door reader").

[4] The method of claim 2, wherein the identifier comprises a selected one of a social security number, a driver's license number, an affinity program account number, and a credit card number.

140. *See* [3], *supra*. As discussed in §IX.B.1, Holloway identifies scenarios where RFID technology is used through a mobile telephone, including "all conventional **credit and debit card transactions**." APPLE-1006, 7:28-32. Further, from Pitroda, a user can "select a credit card account on the client's electronic transaction device 12 and transmit the account information to the restaurant server's electronic transaction device 12." APPLE-1007, 8:18-29. In Willgert-Mooney-Holloway-Pitroda, a mobile telephone would have been configured to output identity information (***RFID data***) with a ***credit card number*** for use in a RFID smartcard-based financial transaction.

141. By 2002, RFID RID technology was known for its ability to transmit data wirelessly between an RFID transponder (or tag) and a reader. This technology was seen as suitable for credit card information because RFID tags were capable of storing small amounts of data, such as account numbers, which could be wirelessly transmitted when within range of an RFID reader. These techniques promised faster transactions and reduced the need for physical contact

between the card and the reader. One successful example of such a system is the Octopus Card launched in 1997 by Hong Kong's mass transit system (MTR)[10] [11].

[5] The method of claim 2, wherein the method further comprises facilitating a user in selecting the RFID data from a plurality of the RFID data using the mobile communication device.

142. Holloway describes a mobile telephone "incorporat[ing] the functionality of a number of different cards within the one mobile telephone," which, in combination with Willgert and Mooney, renders this claim obvious. APPLE-1006, 12:5-18.

143. As discussed for [2], Pitroda teaches user selection of (***facilitating the user in selecting***) an RFID smart card (***RFID data***) from among a wallet of available RFID smart cards (***from a plurality of the RFID data***). APPLE-1007, 7:16-38, 8:18-29. A POSITA would have understood and found obvious that implementations of the Willgert-Mooney-Holloway-Pitroda phone to enable user selection of a particular RFID smart card from "different cards" for use in an RFID smart card transaction. APPLE-1006, 12:11-18; *see id.*, 7:28-32, 10:4-15. In such implementations, each RFID smart card would have been associated with different identification information (e.g., different credit card number), and the identification information associated with the "different cards" (and stored in memory)

[10] https://www.octopus.com.hk/en/consumer/octopus-cards/about/index.html
[11] http://news.bbc.co.uk/1/hi/technology/3121652.stm

collectively represent ***a plurality of the RFID data***. *See id.*, Abstr. ("[t]he memory (16) may have sub-divisions corresponding to different smart cards"), 12:11-18 ("[t]he memory within the telephone 10 may be sub-divided into a number of mutually secure areas partitioned by firewalls[,]" which "makes it possible to allocate service providers with individual areas for their particular application[]" and "possible to incorporate the functionality of a number of different cards within the one mobile telephone."). In ***facilitating selection of*** an RFID smart card from "multiple cards" through a user interface (***using the mobile communication device***), the Willgert-Mooney-Holloway-Pitroda phone would have thereby ***facilitat[ed] the user in selecting*** an RFID smart card (***RFID data***) from multiple available RFID smart cards (***from a plurality of the RFID data***).

144. Further, because a user selection of an RFID smart card allows the transmission of identification information of the selected RFID smart card by the mobile device, a POSITA would have understood that selection of the RFID smart card itself is a selection of the outputted identification information (***RFID data***) from amongst the identification information for different available RFID smart cards (***plurality of the RFID data***).

[6] The method of claim 2, wherein the method further comprises facilitating provision of the RFID data to the mobile communication device.

145. As discussed for [6] in Ground 1A (§X.A.2), Willgert teaches that the "the transponder may also be designed to enable information to be written into the transponder memory, so that said information can be read-out from the memory later on, in the aforesaid manner [(in response to a query/probing signal)]." APPLE-1004, [0018]. By enabling information to be written into transponder memory, the Willgert thereby discloses ***facilitating provision of the RFID data to the mobile communication device***. *Id.*

146. Further, in Willgert-Mooney-Holloway-Pitroda, a mobile telephone stores "a number of different cards within the one mobile telephone," as described in Holloway. APPLE-1006, 12:11-18; *see id.*, 2:15-23 ("mass transit, vending machines, access control and use as an electronic purse"). This stored information would have been obtained at least during an initial configuration operation through one of several exemplary processes described in Pitroda as being used by transaction service providers to provide RFID smart card information to a mobile telephone. *See, e.g.*, APPLE-1007, 3:59-4:40. Pitroda's Figure 10 references a "transaction service provider service flow," during which a user registers as a new client (step 150) and a "new electronic transaction device 12 requested by [the] client." APPLE-1007, 17:44-62. During this process, a "Citibank MasterCard" is

"Loaded" onto a client's device by the transaction service provider (step 158) and a client profile is updated (step 160). *Id.*, 17:63-65. Further, the transaction service provider may "[issue account services," which include "activating specific accounts, such as credit cards, on an electronic transaction device 12" after which "the specific card(s) may be **downloaded** from the transaction service provider 10 to the electronic transaction device 12." APPLE-1007, 12:6-14. A POSITA would have understood that "loading" (or "download[ing]") of RFID smart card information onto Willgert-Mooney-Holloway-Pitroda telephone involves the provision of identification information to be used in an RFID smart card transaction (***provision of the RFID data***).

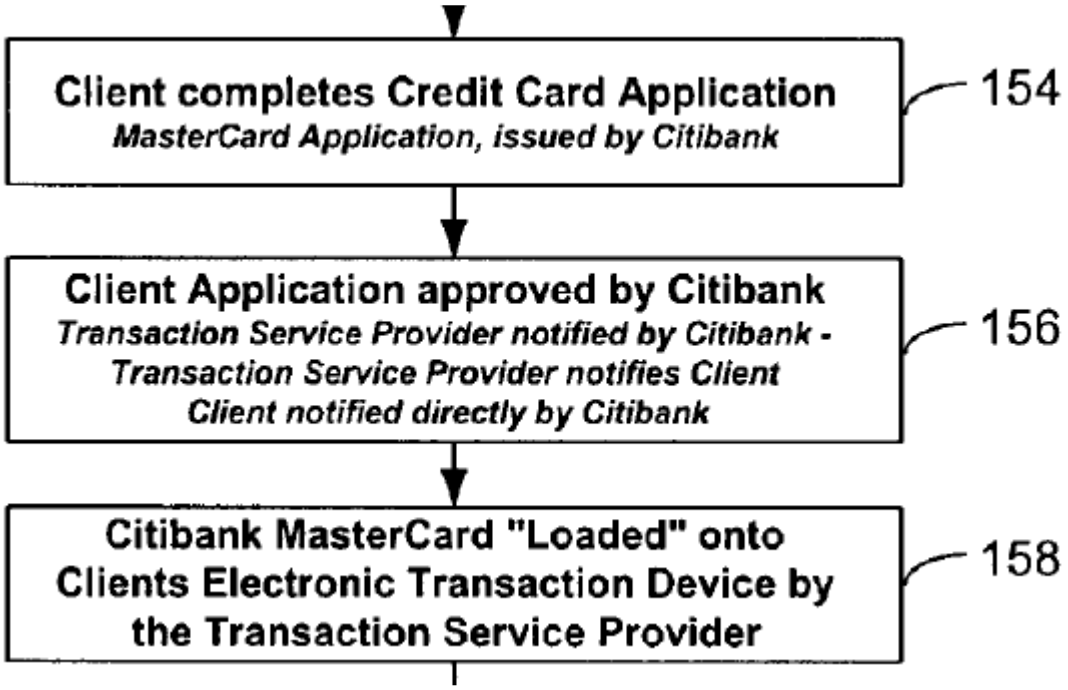
[7] The method of claim 6, wherein facilitating provisioning of the RFID data to the mobile communication device includes facilitating provision of at least a signaling attribute associated with the outputting of the RFID data.

147. As discussed for [7] in Ground 1A (§X.A.2), Willgert teaches that the "the transponder may also be designed to enable information to be written into the transponder memory, so that said information can be read-out from the memory later on, in the aforesaid manner [(in response to a query/probing signal)]." APPLE-1004, [0018]. By enabling information to be written into transponder memory, the Willgert thereby discloses ***facilitating provision of the RFID data to the mobile communication device***. *Id.* Further, a POSITA would have understood and found obvious that, in providing transponder data to a mobile telephone, the

data can be "read-out from them memory later on" such that the information written into transponder memory includes attributes associated with a subsequent transmission based on read-out (***at least a signaling attribute associated with the outputting of the RFID data***). *Id.*

148. Furthermore, in Willgert-Mooney-Holloway-Pitroda, a mobile telephone stores "a number of different cards within the one mobile telephone," as described in Holloway. APPLE-1006, 12:11-18; *see id.*, 2:15-23 ("mass transit, vending machines, access control and use as an electronic purse"). This stored information would have been obtained at least during an initial configuration operation through one of several exemplary processes described in Pitroda as being used by transaction service providers to provide RFID smart card information to a mobile telephone. *See e.g.*, APPLE-1007, 3:59-4:40. Pitroda's Figure 10 references a "transaction service provider service flow," during which a user registers as a new client (step 150) and a "new electronic transaction device 12 requested by [the] client." APPLE-1007, 17:44-62. During this process, a "Citibank MasterCard" is "Loaded" onto a client's device by the transaction service provider (step 158) and a client profile is updated (step 160). *Id.*, 17:63-65. Further, the transaction service provider may "[i]ssue account services," which include "activating specific accounts, such as credit cards, on an electronic transaction device 12" after which "the specific card(s) may be **downloaded** from

the transaction service provider 10 to the electronic transaction device 12." APPLE-1007, 12:6-14. A POSITA would have understood that "loading" (or "download[ing]") of RFID smart card information onto Willgert-Mooney-Holloway-Pitroda telephone involves the provision of identification information to be used in an RFID smart card transaction (***provision of the RFID data to the mobile communication device***).



APPLE-1007, Fig. 10 (cropped)

149. By the Critical Date, RFID readers of different transaction service providers were known to use different signal formats (e.g., different signal frequencies, different coding schemes). *See* APPLE-1025 ("other varieties of tags and sensors have been developed which operate in the frequency range 50 Hz – 50

MHz"). The receipt of provider-specific signal format information by the Willgert-Mooney-Holloway-Pitroda telephone would have enabled communications with the different types of RFID readers described in Holloway." APPLE-1006, 7:22-26 (describing a "reader" associated with "mass transit application," 7:27-30, describing a "reader that is interfaced to the retailer's EPOS (electronic point-of-sale) system," and 8:14-24, describing a "reader fitted to a vending machine").

150. Moreover, "various RFID readers used different generations of smart card technology, and at least some of the RFID readers described in Holloway would have used different frequencies and and/or different signal formatting requirements (***signaling attributes***), including different International Organization for Standardization (IOS) standards." APPLE-1019, 20 (which recognizes that RFID signals can have different ISO standards based on security requirements). And, because Holloway teaches "one mobile telephone" for "a number of different cards," a POSITA would have recognized that the RFID smart card information "loaded" or "downloaded" onto the Willgert-Mooney-Holloway-Pitroda telephone would include provider-specific signal information (***signaling attribute***) for enabling the telephone to communicate with different types of RFID readers (e.g., each associated with a different transaction service provider). Indeed, provisioning of RFID signal information to RFID transponders to enable communications with

RFID readers was conventional by the Critical Date. *See, e.g.*, APPLE-1006, 2:15-23, 4:1-2, 4:20-27, 7:11-20, 9:1-6; APPLE-1025; APPLE-1004, [0017], *see id.*, [0015] ("[t]he identity can be read by a communicator at a given short distance").

[13] The method of claim 10, wherein the instructions are further configured to cause the mobile communication device to facilitate provision of the RFID data to the mobile communication device.

151. *See* [6], *supra*. As discussed for [1.2] in Ground 1A (§X.A.1), in implementations of Willgert-Mooney-Holloway, signal transmission functionality of the "communications unit" is controlled by control circuit 6, which may be provided using a processor that executes software instructions (***the instructions***) stored in memory. *See* APPLE-1004, [0017]-[0019], [0022]; APPLE-1012, Abstract, 13:1-12, 13:21-36. The software instructions provide signal transmission functionality, and would have been ***configured to*** enable an RFID transponder to facilitate provisioning of RFID smart card information to a mobile telephone (***facilitate provision of the RFID data to the mobile communication device***). *See* [6], *supra*; *see also* APPLE-1006, 2:15-23, 4:1-2, 4:20-27, 7:11-20, 9:1-6; APPLE-1025.

[31] The mobile communication device of claim 30, wherein the instructions are further configured to cause the mobile communication device to include provisioning of at least a signaling attribute associated with the outputting of the RFID data in the form of a radio frequency signal.

152. *See* [7], *supra*. As discussed for [7], in implementations of Willgert-Mooney-Holloway-Pitroda, software instructions (***the instructions***) provided by a

processor are ***designed to*** enable an RFID transponder to facilitate provisioning of RFID smart card information to a mobile telephone. *See* APPLE-1006, 2:15-23, 4:1-2, 4:20-27, 7:11-20, 9:1-6; *see, e.g.*, APPLE-1025. Such provisioning would have included proprietary and/or format signal information (***signaling attribute associated with the outputting of the RFID data***), which would have allowed the mobile device to output identification information of different RFID smart cards (***in the form of a radio frequency signal***). APPLE-1025.

2. Claims 10-12, 14, 17-24, 27-31

153. Willgert-Mooney-Holloway-Pitroda renders the following claims obvious in same manner as discussed above.

Claim	Corresponding Claim
[10], [17], [24], [27]	[2]
[11], [12], [18], [19], [28], [29]	[3]
[20]	[4]
[21]	[5]
[14], [23], [31]	[7]
[22], [30]	[13]

XIII. CONCLUSION

154. The findings and opinions set forth in this declaration are based on my work and examinations to date.

155. I may continue my examinations. I may also receive additional documentation and other factual evidence over the course of this IPR that will allow me to supplement and/or refine my opinions. I reserve the right to add to, alter, or delete my opinions and my declaration upon discovery of any additional information. I reserve the right to make such changes as may be deemed necessary.

156. In signing this declaration, I recognize that the declaration will be filed as evidence in an IPR before the PTAB. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.